

Safety Culture in Long-Term Care Organizations: What Can Be Learned from the Commercial Aviation Industry?

by

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Abstract

The safety of older adults requiring institutionalization due to their higher care needs is an important public health concern. This capstone paper defines the emerging concept of safety culture and provides a critical examination of the current gaps in the safety culture in Long-Term Care (LTC) organizations designed mostly for older adults who cannot live independently at home. Conceptualized as the manifestation of complex systems failure, falls are the most commonly reported adverse events and a great safety concern in LTC. An overview of a successful safety culture in the commercial aviation industry is explored for policy and practical implications. It is hypothesized that the lessons from the commercial aviation industry can be translated to improve the safety culture in LTC and ensure the safety of and prevent harm to older residents. This exploratory analysis reflects how an effective safety culture could contribute to optimize the safety of residents by the processes of care in place. Challenges in addressing resident safety in LTC on quality outcomes and the resident's rights to autonomy and human dignity in LTC are also addressed.

Keywords: Safety culture or organizational culture; long-term care or nursing homes or residential care; aviation; risk management; falls or injury prevention.

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List of Acronyms

ACSNI	Advisory Committee on the Safety of Nuclear Installations
CPSI	Canadian Patient Safety Institute
HRO	High Reliability Organization
LTC	Long-Term Care
NPSA	National Patient Safety Agency
NTBS	National Transportation Board of Safety
TIPS	Technology for Injury Prevention in Seniors
WHO	World Health Organization

Glossary

Adverse events	Injury caused by the medical management rather than by the underlying disease or condition of the patient (Kohn, 2000, p. 25).
High Reliability Organization	Systems having fewer than their “fair share” of accidents. (Reason, 1997, p. 37). Resilient systems, [which] are able to tolerate errors and to contain their consequences (Reason, 2000, p. 770).
Incident	Any unintended or unexpected incident, which could have or did lead to harm for one or more patients (NPSA, 2004, p. 1).
Long Term Care (LTC)	Health care organizations or facilities that provide living accommodation for residents who require on-site delivery of 24 hour, 7 days a week supervised care, including professional health services, personal care and services such as meals, laundry and housekeeping (Health Canada, 2005, n.p.).
Patient safety	Freedom from accidental injury (Kohn, 2000, p. 155).
Residents	Individuals living in LTC organizations (Wagner & Rust, 2008, p. 8).

If you are convinced that your organization has a good safety culture, you are almost certainly mistaken. Like a state of grace, a safety culture is something that is striven for but rarely obtained. As in religion, the process is more important than the product. The virtue – and the reward – lies in the struggle rather than the outcome. (Reason, 1997, p. 220)

1. Introduction

Concerns about patient safety in health care settings have been well documented (Buljac-Samardžić, van Woerkom & Paauwe, 2012; Byrne, 2005; Kohn, Corrigan & Donaldson, 2000; Ruchlin, Dubbs & Callahan, 2004). Patient safety is recognized as an important component in providing high quality of care and yet, achieving quality improvements in patient safety is one of the key challenging tasks that healthcare organizations are confronted with (Milligan, 2006; Ruchlin et al., 2004). Deriving from the emerging concept of safety culture, research on patient safety aims to improve the safety of and prevent the risk of harm among the recipients of healthcare organizations. Although the promotion of a safe working environment will also provide benefits to health care providers, this capstone paper focuses on improving the safety of health care recipients.

Before operationalizing the state of safety culture in LTC, this capstone paper explores the meaning of the concept of “safety culture”. There is currently a lack of consensus on the definition and conceptualization of this term in healthcare research (Halligan & Zecevic, 2011). Ruchlin, Dubbs & Callahan (2004) also argue that attention needs to shift from micro-level to macro-level issues in order to effectively address safety culture issues in LTC. Micro-level issues are strictly related to specific aspects of physical and social care (that is preventing adverse events through interventions) whereas macro-level issues are directed to improve the organizational culture and the level of commitment to safety from the leadership. Doing so deepens the understanding of the term “safety culture”, which is a step required to creating and sustaining an effective safety culture in healthcare organizations.

Then, this capstone paper explores the current state of safety culture in a specific health care organization that is Long-Term Care (LTC). The term LTC refers to health care organizations established to provide a higher level of care principally to older and vulnerable individuals who are no longer able to live independently in their own home

(Health Canada, 2005). The term “patient” used in this capstone paper makes reference to these individuals living in LTC, also called “residents”. The aim of LTC organisations is to create a safe and supportive living environment for patients, to support their quality of life and to preserve their rights to autonomy, participation, personal fulfillment, and human dignity (Buljac-Samadžić, van Woerkom & Paauwe, 2012). The relocation of individuals to such organizations is guided by the need to ensure their safety and to prevent risk of harm (Chow, 2003; Minkler, 1984). Much effort is undertaken within LTC to create a home-like environment based on the person-centered model of care and to take into consideration the rights of residents for autonomy and quality of life. Yet, the prevalence of adverse events in such organisations demonstrates that there are weaknesses and limitations in effectively ensuring their safety.

To illustrate an important safety issue and its implications for policy and practice in LTC, this capstone explores one of the most commonly reported adverse events in LTC, namely falls. It is now widely recognized that falls and falls-related injuries in LTC result from the interplay of multiple intrinsic, extrinsic and organizational risk factors (Tideiksaar, 2010). An average of 100 to 200 falls occurs each year in LTC facilities with an average of 100 beds, despite evidence-based guidelines for fall prevention in LTC (Byrne, 2005; Tideiksaar, 2010). Falls are recognized as multifactorial in LTC and result from the failure of complex systems that are ineffective in managing the risk and consequences of falls (Nowak & Hubbard, 2009). The issue of falls is an important concern within a medical model of care that focuses on issues of safety and the avoidance of harm. This is also an important objective in a wider sense because falls amongst vulnerable older residents may negatively impact their right for autonomy, dignity and quality of life (Barry & Yuill, 2008). Policy-makers and health authority managers of LTC have addressed these concerns and taken steps to implement best clinical practice guidelines such as the least restraint policy and an open reporting system of patient injury to create a no blame culture. There is also a commitment to creating a home-like environment in LTC based on the person-centered model of care. Whilst there is variability in the safety culture within each LTC and best practices implemented to enhance the safety of residents in LTC, this capstone project is a critical evaluation of the gaps identified in the literature on healthcare research concerning

safety issues and on the effective prevention of adverse events in LTC (Buljac-Samardžić et al., 2012).

There is an increasing awareness of the gap in addressing and investigating the multiple key issues and inter-related factors that affect the safety culture of healthcare organizations, particularly in LTC (Wagner & Rust, 2008). The rate of adverse events, a term defined as “an injury caused by the medical management rather than by the underlying disease or condition of the patient”, is considerably higher in LTC (Kohn, Corrigan, & Donaldson, 2000, p. 25). Chaudhury, Mahmood and Valente (2009) add that these adverse events result from several key factors that impact safety in LTC, including: “the regulatory nature of the work environment, organizational leadership and commitment, management policies and procedures, complexity of tasks involved, work culture and physical environment” (p. 756-757). Safety research in LTC also indicates that it lags behind in terms of safety benchmarks when compared to other healthcare organizations, such as acute care hospitals (Bonner, Castle, Perera & Handler, 2008). The safety issues and gaps in LTC are explored in this capstone paper. This gap raises the concerns of not only explaining what causes adverse events to occur but also addressing steps to prevent the re-occurrence and the consequences of adverse events. This step is crucial to ensuring progress towards creating an effective safety culture in LTC (Ruchlin, Dubbs & Callighan, 2004).

With the goal of improving the state of the safety culture in LTC, this paper proposes a novel comparison of the safety culture of a High Reliability Organization (HRO) that is the commercial aviation industry, to that of LTC. HRO are described as “resilient systems that are able to tolerate errors and to contain their consequences” (Reason, 2000, p. 770). This capstone describes the safety strategies established by the commercial aviation industry to achieve excellent safety performance and suggests potential lessons from the safety culture of this industry to the one in LTC. To do so, this capstone paper first explores the emerging concept of “safety culture”, gives a description of the model of safety culture with its six dimensions and provides an explanation of the evolution of the model of cultural safety maturity (Hudson, 2003). Second, it explores the current state of the safety culture in LTC. This is followed by a description and an analysis of the safety culture developed by the commercial aviation industry on how it has established excellent safety performance in recent decades. This

capstone paper will provide an analytical framework for the policy analysis, practical implications and realistic actions to optimize the safety culture in LTC.

2. Methods

2.1. Literature Search

In conducting a literature search in this area, two methodological approaches were considered – a systematic literature review and a scoping review. An initial exploration of the literature identified that the chosen field of interest of this essay was broad, multifaceted and had not been reviewed comprehensively before. Conducting a literature search for this essay was complex and opting for a systematic literature review based on three key words, “safety culture”, “commercial aviation industry” and “long-term care” was not suitable for this capstone paper because of the lack of overlap in these three key themes. This paper addresses three topics that are multidisciplinary in nature, which makes it challenging to tackle and understand them from the methodology of a systematic review. Given the scarcity of the literature specifically examining the safety culture in both the commercial aviation industry and LTC, a scoping review was therefore used to review and synthesize relevant literature for inclusion in this essay. A scoping review allowed more flexibility than a systematic review in terms of criteria for exclusion and inclusion that were not based on the quality of the study, but on their relevance to the researched topic (Arksey & O’Malley, 2005).

Levac, Colquhoun & O’Brien have stressed that an important component of scoping review methodology is consultation with key stakeholders as an opportunity for knowledge transfer and exchange and to offer additional value to the scoping review. Consultation workshops with an expert panel therefore took place between November 2012 to March 2013 in the presence of the writer, primary supervisor (Dr. Andrew Sixsmith), Dr. Fabio Feldman, post-doctorate students from the department of Gerontology and Dr. Aleksandra Zecevic. These workshops were designed to “add methodological rigor, offer additional sources of information, perspectives, meaning and applicability to the scoping study”, incorporate opportunities for analytical reinterpretation and knowledge translation through discussion of this broad and novel topic and to

generate ideas for practical and policy implications (Levac et al., 2010, p. 7). The result of these discussions will be explored later in the section, entitled “Recommendations for Practice and Policy Implications”.

In considering the three key search words, that is, safety culture, aviation and LTC, the concepts of aviation and LTC are not mutually exclusive with one another, whilst the concept of safety culture overlaps with both LTC and aviation as described in the Figure 2.1. There is literature on safety culture that pertains specifically to aviation and then specifically to LTC.

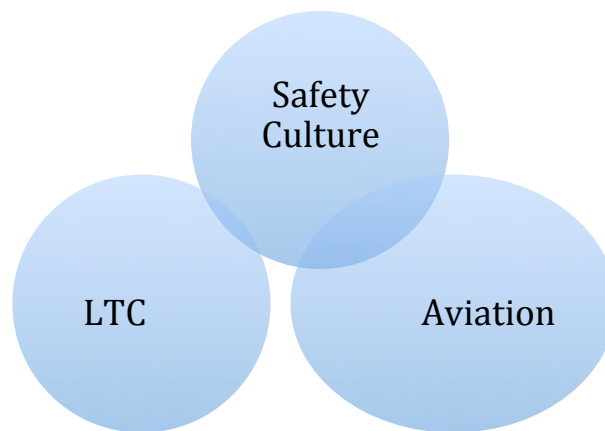


Figure 2.1. Key Concepts

The chosen methodology in this scoping review aims to answer a set of four questions, which are as follows: 1) How do we define the concept of safety culture? 2) What is the current state of safety culture in LTC? 3) What did the commercial aviation industry do to achieve an excellent safety culture? And 4) what could the LTC learn from the commercial aviation industry? To answer these four main questions, a manual search of key hand-selected peer-reviewed journal articles and books published to date in the English language was conducted.

The first question entailed nine journal articles and four books to define the concept of safety culture in the general sense in any given organization and to describe the six dimensions of safety culture and the model of safety cultural maturity. The literature review by Halligan & Zecevic (2011) was used as the foundation for this first section. Before comparing the safety culture in the commercial aviation industry to the

one in LTC, the same methodological approach of scoping review was used to understand the safety culture of these two organizations. Pertaining to health care and LTC, multiple electronic databases (CINAHL, Medline and Ovid) were searched. The key search words used for searching these electronic databases included the term “patient safety” and all expressions referring to the term “safety culture” in healthcare, including: safety measures, medical errors-prevention, safety climate or climate of safety, patient safety culture, culture of safety, organizational culture, falls or injury prevention and risk management. A separate search was conducted combining the terms “safety” and “safety culture” to the following terms: resident, patient, nursing home, long-term care or residential care. The article by Wagner & Rust (2008) was used as the primary resource for the section on the safety culture in LTC given the paucity of research that addresses both “safety culture” and “LTC”. The reference list of this literature review was cross-referenced manually to identify additional relevant and pertinent literature. This search specific to LTC included 46 relevant peer-reviewed journal articles and four online books.

For the aviation industry, the following key words were searched: “aviation safety”, “aviation” and “safety”, “risk management” and “safety” using the Business Source Complete database. Given the challenge to find literature on the aviation topic as it fell outside of the realm of the field of gerontology, the gerontology librarian recommended consulting the librarian from the geography department at Simon Fraser University who found one key article used in this review (by Lewis et al., 2011). In parallel, Dr. Erik van der Lelij, a former graduate student of a well-renown professor in aviation and pilot (Sidney Dekker), offered his time to review the section on the commercial aviation industry and provided pertinent peer-reviewed journal articles to further the understanding of how the commercial aviation industry established its proactive safety culture. A total of 13 peer-reviewed articles, one book and one external website were reviewed to cover the safety culture in aviation in this capstone paper. A total of 69 peer-reviewed journal articles and nine books published since 1969 to 2013 were reviewed to explore the scope of this broad topic.

3. Safety Culture

3.1. Overview and History of Safety Culture

The current state of safety culture in health care organizations has become a “major public health concern for the general public and policymakers since the publication of the landmark report by the Institute of Medicine (IOM) in 2000 – To Err is Human” (Byrne, 2005, p. 17). In recent years, the expanded interest in the research on patient safety has led to the recognition of the importance of creating an effective safety culture in healthcare organizations (Hudson, 2003; Ruchlin, Dubbs & Callahan, 2004). Research has also supported the relevance of translating the lessons from HRO, particularly the ones from the commercial aviation industry, in improving the safety of health care recipients and reducing adverse events in healthcare organizations (Hudson, 2003; Wilf-Miron, Lewenhoff, Benhyamini & Aviram). Lessons from the aviation industry on the prevention of air crashes have started “to influence the statutory frameworks that dictate the safety management systems in healthcare organizations” (Anthonsen, 2009, p. 1). Safety strategies designed to prevent medication errors have derived their lessons from the commercial aviation industry (Pape, 2003). This knowledge translation to health care has served to illustrate how the systems approach to the effective management of safety and the positive attitudes adopted by the commercial aviation industry have contributed to the implementation of effective safety operational procedures in high-risk and complex health care organizations.

Historically, the term “safety culture” was first used in the investigation report of the Chernobyl nuclear plant disaster held in 1986 (Anthonsen, 2009). The investigation reports revealed that this major accident was caused by the breakdown of complex systems causing human beings to fail in doing what they were supposed to do (Kohn, Corrigan & Donaldson, 2000). Further investigations recognized the complexity of high-risk organizations and remarked that adverse events were not simply caused by human errors, but rather due to failures in the systems causing adverse events to happen.

These investigations shed light into the fact that systems errors resulting in a poor safety culture were the root causes of this disastrous accident rather than human errors per se (Reason, 2000). High-risk organizations realized that accidents were attributable not only to technological aspects of engineering systems, but were explained by both human factors and the state of the safety culture. This realization was crucial in addressing the key contributing social and organizational factors on safety outcomes, and in moving away from a culture of blame towards a culture of safety (Anthonsen, 2009).

The investigation reports of major and fatal accidents such as the Chernobyl nuclear disaster marked the crossroads in safety culture research focusing on the role of human error. The recognition of the importance of a systems approach in preventing risk and ensuring safety was essential to establish a positive safety culture, and thereby improve the safety performance in high-risk organizations including the commercial aviation industry (Anthonsen, 2009; Reason, 2000). These investigations also emphasized the importance of creating “a corporate atmosphere or culture in which safety is understood to be and is accepted as the number one priority” (Cullen, 1990, p. 300). The commercial aviation industry, a high-risk organization, adopted positive attitudes towards safety, recognized the role of human errors and implemented safety management systems (described later in the chapter on the commercial aviation industry) to mitigate and prevent adverse events from human errors and systems failures, and thereby obtained the prestige of being recognized as an extremely safe HRO (Anthonsen, 2009).

3.2. Definition of Safety Culture

Despite the growing interest and discourse on safety culture in health care research, there has been considerable lack of clarity on what this concept means (Anthonsen, 2009). Although several attempts have been made to explain and evaluate this concept, there is the lack of a theoretical model or framework upon which the concept of ‘safety culture’ rests (Halligan & Zecevic, 2011). The most frequently cited and applied definition derives from the Advisory Committee on the Safety of Nuclear Installations (ACSNI) where safety culture is defined as:

The product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization's health and safety programmes. Organizations with positive safety culture are characterised with communications founded on mutual trust, by shared perceptions of the importance of safety, and by confidence in the efficacy of preventative measure. (ACSNI, 1993, p. 23)

This definition formed the basis of safety research explaining that “the safety level of an organization is influenced by the attitudes of the management towards safety and the perceived priority given to safety training” (Anthonsen, 2009, p. 16). In other words, an effective safety culture is the result of the management and leadership that values safety prevention and is committed to adopt safety procedures (Confederation of British Industry, 1990). Centring on patient safety, the above definition of safety culture from the ACSNI has also been adopted by and made applicable to healthcare, where the “goal of patient safety is to reduce the risk of injury or harm to patients from the structure and process of care” (Castle, Handler, Engberg & Sonon, 2007, p. 67). Bonner, Castle, Perera & Handler (2008) supported the same definition of safety culture and stated that the essential objective of an improved safety culture is to create highly reliable and safe healthcare systems.

3.3. Conceptualization of Safety Culture

Key to the conceptualization of safety culture has been the awareness that “a safety culture must be built on an understanding of the cause of unsafe acts” (Ruchlin, Dubbs & Callahan, 2004, p. 50). Ruchlin et al. (2004) provided an insightful theoretical framework consisting of two key complementary paradigms that guided the understanding of adverse events or error causation and of the prevention of adverse events to improve safety culture in healthcare organizations: the normal accident theory and the high-reliability organization (HRO) theory.

3.3.1. Normal Accident Theory

According to the normal accident theory, errors occurred as a result of systems failures, not due to human errors (Ruchlin, Dubbs & Callahan, 2004). Deriving from Reason's work on systems and risk management (2000), Ruchlin et al. (2004) also agreed that safety concerns and accidents resulted from multiple errors and failures of the systems to address and mitigate these errors. The normal accident theory also stipulated that the dual challenge of dealing with errors have been one of learning from errors rather than identifying a person to blame (most of often the frontline staff that is either a pilot or health care professional) and two of finding ways to better design systems that minimize future errors and accidents (Ruchlin et al., 2004). Reason (2000) proposed an important causation model, called the "Swiss Cheese" model of defenses illustrated in Figure 3.1, which provided an explanation of why accidents occur. This model has been useful in improving the safety and reducing the risk of error in healthcare (Ruchlin et al., 2004). In his model, Reason (2000) explained that accidents occurred when organizational, human, and technical defenses were inadequate or lacking (Ruchlin et al., 2004, p. 51). Reason (2000) summarized that weakness in defensive layers at either levels in the system, that is, human, engineering/equipment, or administrative level, resulted in accidents. He referred to the following analogy to explain the "holes in defences" layers:

They are more like slices of Swiss cheese, having many holes – though unlike cheese, the holes are continually opening, shutting, and shifting their location. The presence of holes in any one "slice" does not normally cause a bad outcome. Usually, this can only happen when holes in many layers momentarily line up to permit a trajectory accident opportunity – bringing hazards into damaging contact with victims.

(Reason, 2000, p. 769)

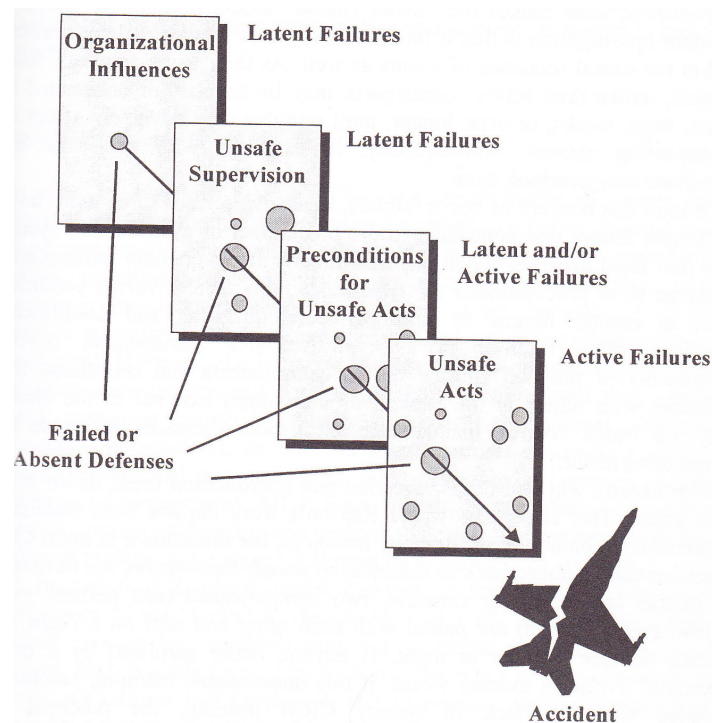


Figure 3.1. The Swiss-Cheese Model

Note: Reprinted with permission of the Publishers From "The Swiss-Cheese Model" in *A Human error approach to aviation accident analysis: The human factor analysis and classification system* by Douglas. A. Wiegmann & Scott A. Shappell. (Farnham: Ashgate, 2003), p. 47. © Ashgate 2003.

As illustrated in Figure 3.1, Reason (2000) referred to errors and systems deficiencies as “holes in defences” divided into two categories: (1) active failures and (2) latent conditions. On the one hand, Reason (1997) defined active failures as “unsafe acts caused by people who are in direct contact with the patient or system (that is at the “sharp end” of production – the human system interface)” including frontline staff such as nurses or air pilots (Ruchlin, Dubbs & Callahan, 2004, p. 51). These acts include “slips, lapses, fumbles, mistakes, and procedural violations” (Reason, 1997; Ruchlin et al., 2004, p. 51). On the other hand, latent conditions “arise from decisions (within the system) made by designers and builders, or by management (such as time pressure, lack of equipment, and extended work schedules), or they are inherent in current procedures and may lie dormant for many years before they combine with active failures to create an accident opportunity” (Ruchlin et al., 2004, p. 51).

Ultimately, Reason (1997) stipulated that accidents are due to systems errors rather than human errors, shifting the blame away from people and concluding that “the best people can make the worse errors as a result of latent conditions” (Ruchlin et al, 2004, p. 51). This conceptualisation of error management moved towards addressing the latent conditions in the system, that is, using a holistic and systems approach to remove errors (Reason, 2000). This approach also emphasised the need to understanding the interplay of active failures and latent conditions causing safety problems in healthcare organizations and emphasized the importance of adopting a proactive rather than reactive safety culture to manage and prevent risks. This also meant using a holistic approach and involving multiple key stakeholders, including the residents, their family, the frontline staff, the interdisciplinary team, the actual task and work environment and ultimately the entire organization as a whole (Ruchlin et al., 2004).

3.3.2. High-reliability Organization (HRO) Theory

The HRO theory emerged from the investigation reports of adverse events in different high-risk organizations. The commercial aviation industry is an example of such organizations, which have implemented rigorous investigation systems the success of which has achieved “very low accident and error rates” (Ruchlin, Duggs & Callahan, 2004, p. 52). The main premise of this theory was that accidents occurred because human beings who “operate and manage complex systems are themselves not sufficiently complex to sense and anticipate the problems generated by the system” (Ruchlin et al., 2004, p. 47). Deriving from the systems approach, Reason (2000) not only recognized that humans are highly fallible and that errors are expected, but also emphasized that “proper organizations of people, process, and technology can handle complex and hazardous activities” with the necessary flexibility and education required to minimize the risk of errors (Ruchlin et al., 2004, p. 52).

3.3.3. Informed Culture: A Key Component of Safety Culture

In addition to the recognition that accidents are caused by systems failures, not human errors, Reason (1997) stressed the importance of creating an informed culture. As an important component of safety culture, Ruchlin, Duggs and Callahan (2004) defined an informed culture as having the presence of an “information system that

collects, analyses and disseminates from incidents and near misses as well as regular proactive checks on the system's vital signs" (p. 53). Hudson (2003) explained that an informed culture is one where "managers know what is going on in their organizations and the workforce are willing to report their own errors and near misses" (p. 9). Ruchlin et al. (2004) similarly commented that leaders from an organization based on an informed culture must "have the knowledge on the human, technical, organizational, and environmental factors that determine the safety of the whole system as a whole" (p. 53).

Reason (2000) stated that an informed culture must establish the presence of four prerequisite subcultures to create a safe environment, namely (1) a reporting culture; (2) a just culture; (3) flexible culture; and (4) a learning culture. A *reporting culture* means that "people are prepared to report accidents and near misses [where] an effective reporting culture depends in turn on how an organization handles blame and punishment" (Ruchlin, Duggs & Callahan, 2004, p. 53). Reason (2000) reported that it was the complete absence of a reporting culture within the Soviet Union that contributed to the Chernobyl nuclear disaster (p. 768). A "*just culture*" features "an atmosphere of trust in which people are encouraged, and even rewarded, for providing essential safety-related information" with a clear understanding of the difference between an acceptable and unacceptable behaviour with the latter resulting in sanctions (Ruchlin et al., 2004, p. 53). Thirdly, a *flexible culture* is defined as an organization having the flexibility to adapt to changes in circumstances based on respect and extensive training in routine and emergency situations. This enables the shift from a hierarchical to a flatter professional structure in which the person in a position at that time can manage a risky situation with the support of the team. Lastly, a *learning culture* is "characterized by the willingness and competence to draw the right conclusions from its safety information system and the will to implement major reforms when their need is indicated" (p. 53). This means that organizations must not only be willing to learn but also prepared to change to improve safety (Hudson, 2003).

3.4. Six dimensions of Safety Culture

In addition to the informed culture and its four subcultures of safety, Halligan & Zecevic (2011) suggested that a positive safety culture must combine the six following dimensions: leadership commitment to safety; open communication founded on trust;

organizational learning; a non-punitive approach to adverse event reporting and analysis; teamwork; and shared belief in the importance of safety (p. 340).

In the book “Know the risk. Learning from errors and accidents”, Duffy and Saull (2003) summarized that an informed culture is essential to achieve a successful safety culture in healthcare and posited that:

What a learning environment means in practice is the existence of an ideal total work environment that strives to be safety conscious in every aspect. The whole work-related system emphasizes and pays unending attention to safety, in all aspects of design, operation, management, and rewards. Thus, the management, organizational structure, staff training, plant condition, trust, free communication, open reporting, blameless appraisal and self-criticism, awareness and readiness, and pay raises all constitute a “culture” that reinforces and rewards safe operation.

(Duffy & Saull, 2003, p. 101)

Ultimately, Ruchlin, Duggs & Callahan (2004) summarized that the following characteristics are prerequisite among individuals working in HRO: “helpful to and supportive of one another; trusting one another; have friendly, open relationships emphasizing credibility and attentiveness” and where “the work environment should be resilient and emphasize creativity and goal achievement, and it should provide strong feelings of credibility and personal trust” (p. 52). Each of the six dimensions of an effective safety culture is here described.

3.4.1. Dimension 1: Leadership commitment to safety

The leadership’s commitment towards safety requires the willingness of managers and leaders to make it their primary concern, ensure it is an organization-wide concern, be aware of the safety procedures in place and take actions that foster a safe and learning environment (Hudson, 2003; Ruchlin, Dubbs & Callahan, 2004). Ruchlin et al. (2004) agreed that the commitment to safety from the leadership is essential and reported six key managerial tasks for the successful implementation of a safety culture by the leadership: establishing direction, aligning people, motivating and inspiring people, planning and budgeting, organizing and staffing and controlling and problem solving (p. 49).

3.4.2. Dimension 2: Open communication founded on trust

As opposite to a culture of blame, this dimension requires all the stakeholders, particularly frontline staff, to communicate openly with the trust, confidence and openness to report any adverse events to their team members and management. Being able to trust one another is one of the characteristics identified in HRO (Ruchlin, Dubbs & Callahan, 2004). Hudson (2003) added that an informed culture “exhibits trust by all [and] trust is developed by being just and informed, when even bad news can be told and accepted as information to be acted upon rather than as a reason to punish” (p. i9).

3.4.3. Dimension 3: Organizational learning

An informed safety culture seeks and provides information about adverse events, incidents and near misses. A trait of an effective or proactive safety culture is to perceive errors and mishaps as opportunities for growth, training and learning, focused on improving existing safety practices and behaviours and in preventing future errors. Unfortunately, health care organizations are blamed for having an educational system that is error-avoidant and risk-averse and consequently, health care professionals are not encouraged to discuss errors openly (Buljac-Samardžić, van Woerkom & Paauwe, 2012). There is a correlation between team stability and opportunities for organizational learning whereby an unstable team due to poor job retention and high turnover may undermine continuity and challenge the ability to share knowledge and learn from one another (Buljac-Samardžić et al., 2012).

3.4.4. Dimension 4: A non-punitive approach to adverse event reporting and analysis

Opposite to a culture of blame, a non-punitive approach incident reporting reflects a reporting culture whereby the frontline staff feels confident and comfortable to report openly any adverse events, incidents and near misses to their team members and management. The reporting approach adopted in HRO such as by the commercial aviation industry encourages reporting incidents anonymously with guaranteed immunity rather than punishment (Lewis, Vaithianathan, Hockey, Hirst & Bagian, 2011). The commercial aviation industry has not only adopted this dimension but also provided an incentive system to report adverse events followed by extensive analysis of the reports

by the National Transportation Board of Safety (NTBS) to prevent future re-occurrences and improve safety practices. In contrast, a culture of blame and a reactive approach to safety and injury prevention still predominate in LTC based on the medical model of care through the use of physical and/or chemical restraints to deal with older residents at high risk of falls and a lack of open communication and poor follow-up of adverse events, e.g. falls, after these inadvertently occur (Bonner, Castle, Perera & Handler, 2008).

3.4.5. Dimension 5: Teamwork

LTC rely heavily on teams of frontline staff and may be perceived as the “essential building blocks”, because they deliver the bulk of the daily care and make decisions on the care required by residents (Buljac-Samardžic, van Woerkom & Paauwe, 2012, p. 281). Ideally, each member of the organization must work together with a common goal of establishing an environment that is devoid of risk or harm. Buljac-Samardžic et al. (2012) explains that the safety culture in LTC, that is, “how teams cope with safety issues such as falls” is important and that team characteristics and the approach to injury prevention enhance or hinders the safety culture of LTC (p. 281). For instance, if a team feels strongly that physical restraints must be used to prevent risk of unsafe acts among older residents, this team is more likely to use a blaming approach resulting in a reactive safety culture. In such a case, teams also fear punishment and feel guilty of their errors, and are less likely to share, discuss or analyze their errors. On the contrary, teams that manage errors using a problem-solving approach are more likely to share, analyze and discuss errors, because they perceive that errors are opportunities for organizational learning and that they will lead to improvements in safety performance (Buljac-Samardžic et al., 2012). Figure 3.2 describes the conceptual framework of this relationship between the coping mechanisms with errors based on the team attributes, leadership styles and team cohesion over time, and the resulting team performance to improve safety.

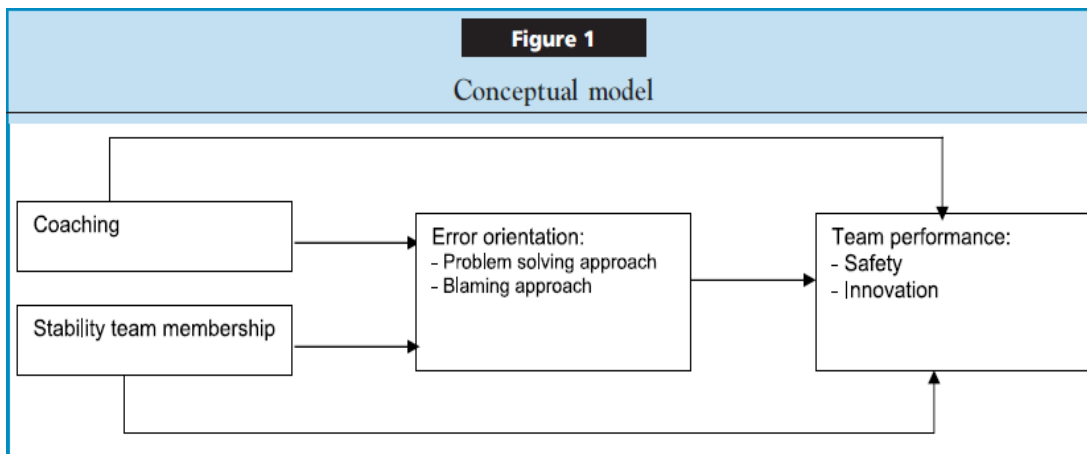


Figure 3.2. Conceptual framework of teamwork on error management and safety performance

Note. Reproduced from “Figure 1”, p. 282, in M. Buljac-Samardžic, M. van Woerkom, & J. Paauwe (2012). Team safety and innovation by learning from errors in long-term care settings. *Health Care Management Review*, 37(3), 280-291. Reprinted with the permission of the publishers Wolters Kulwer Health.

3.4.6. Dimension 6: Shared belief in the importance of safety

This dimension is a crucial element to ensure safety and emphasizes the importance of safety from all stakeholders, that is, from the management to frontline staff, in high-risk organizations. When this dimension is ingrained in the philosophy of error management of a HRO, the shared value and emphasis on safety mean that everyone believes and works towards creating, improving and maintaining a safe environment and to prevent risk of harm or injury. The commercial aviation industry illustrates the example of a HRO that has adopted positive attitudes and a shared belief towards the importance of ensuring safety (Hudson, 2003). Much effort has been invested in investigations research and analysis of adverse events to improve and ensure the safety for all passengers, pilots and aircrew members.

3.5. Model of Safety Cultural Maturity

Conceptually, to integrate the sequential component into our understandings of safety culture, Figure 3.3 describes the evolution towards a mature safety culture. As this model illustrates, each phase of the safety cultural maturity model describes the stage of safety culture development of an organization progressing from the immaturity

towards one based upon increasing informedness and trust (Hudson, 2003). This model showcases that the “safety cultures evolve through five levels of maturity from the least through the mature (pathological, reactive, calculative, proactive and generative)” (Halligan & Zecevic, 2011, p. 340).

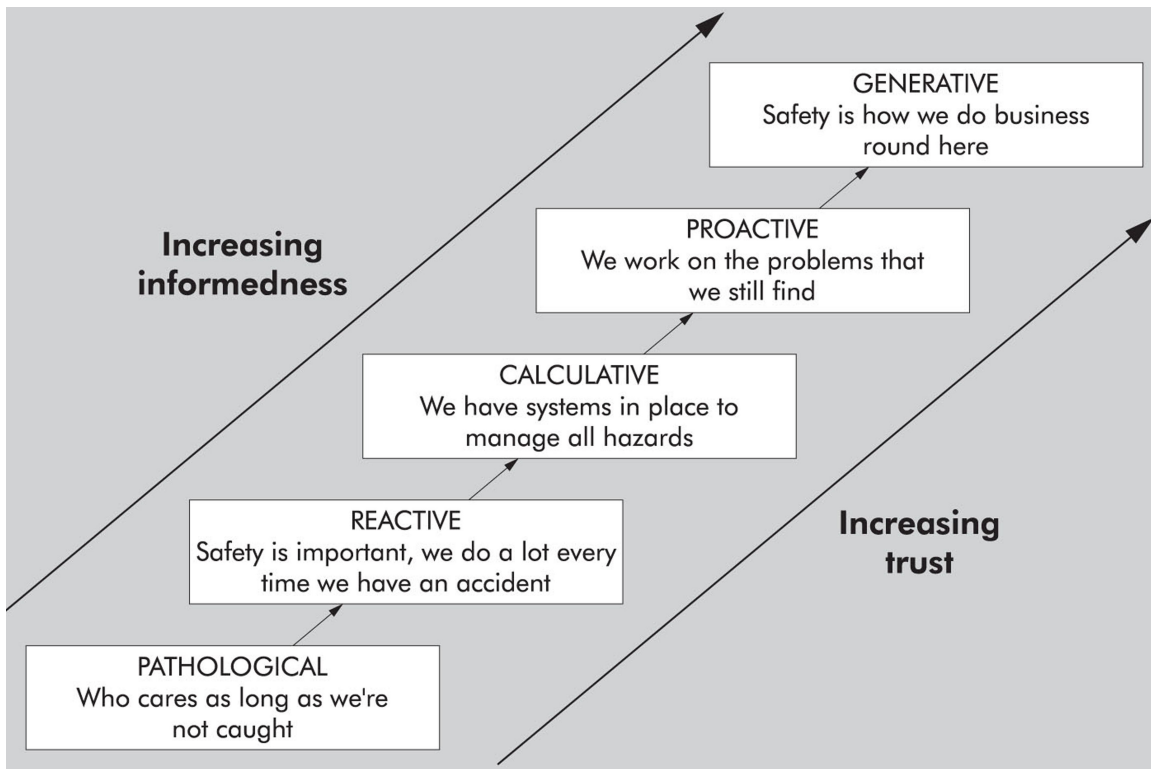


Figure 3.3. The Model of the Maturity of Safety Culture

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A *pathological safety culture* is a top-down approach to safety where frontline workers are blamed for errors and where the leadership conceals their concerns about safety (Hudson, 2003). A *reactive safety culture* is one where “organizations start to take errors seriously but there is only action after incidents” (Hudson, 2003, p. i9). A number of current health care organizations are typical of a reactive safety culture where actions of providing safety equipment such as hip protectors are only put in place after a fall or injury has occurred. A *calculative safety culture* occurs when “safety is driven by management systems and imposed rather than looked for by the workforce” (Hudson, 2003, p. i9). The next stage is a *proactive safety culture* adopted by the commercial

aviation industry whereby redundant safety strategies are implemented to improve safety performance (Hudson, 2003). Lastly, a *generative approach*, for example those used in nuclear plant organizations, is one where “there is active participation at all levels. Safety is perceived to be an inherent part of the business. Organizations are characterised by chronic unease as a counter to complacency” (Hudson, 2003, p.i9). Hudson (2003) describes this type of safety culture as a “healthy state” (p. i9) and a characteristic of an advanced safety culture that is informed, exhibits trust, is adaptable to change and is wary, that is, vigilant of early warning signs that may lead to errors and accidents.

The assessment of the safety culture of high-risk organizations serves as a guide to diagnose their current level of maturity of their safety culture, identifies areas of strengths and weaknesses, directs towards actions to attain the next level of cultural maturity, and thereby, provides a framework for safety improvement (Halligan & Zecevic, 2011). Hudson (2003) argues that healthcare is in its earlier and reactive phase of safety culture development and urges the need of healthcare organizations to move to the next step to improve their safety performance. The need to understand the concept of safety culture is a prerequisite to improve the safety culture of any given organizations. This chapter has reviewed the definition of safety culture in high-risk organizations, proposed the six dimensions that are crucial in the development of a proactive safety culture and described the different stages of safety culture. The next chapter will focus on describing the safety culture in LTC.

4. Safety Culture inn LTC Organizations

4.1. Background

The decision to relocate vulnerable older adults to LTC is often guided by safety concerns arising from the need to provide a higher level of care that can be provided for the individual at home. LTC settings provide health and social care to vulnerable and frail older adults who can no longer live independently due to their increased care needs (Barry & Yuill, 2008). LTC have been criticized for their ability to provide an effective and proactive safety culture and a protected living environment for residents without hindering their independence and well-being. LTC are recognized as healthcare organizations where residents are at a proportionally higher risk of falls and where falls incidents are the most frequently reported adverse events (Wagner & Rust, 2008). Research into patient safety research has primarily focused on the acute care environment, and that which has been conducted in LTC has been concerned with investigating medication errors and infection control (Castle & Sonon, 2006). Although patient safety is seen as a priority, there exists a disjoint between prioritising safety in LTC and addressing it through specific actions. The absence of a set of shared values, beliefs, procedures and processes in place to effectively prioritize safety in LTC is demonstrated in the knowledge gap identified the literature concerning what is understood by the notion of safety culture in LTC settings and how best to address the barriers to improve safety, prevent falls and minimize risk of injury to residents (Wagner & Rust, 2008). It is suggested that understanding the state of the safety culture will help in addressing adverse events such as fall incidents and in working towards improving practice.

4.2. Canadian LTC Organizations

Different provinces and countries use different terminology to refer to LTC, such as residential care facilities and nursing homes to name a few. In this capstone paper,

the term LTC is used and refers to health care organizations or institutions designed mainly for older adults who are no longer able to live independently in the community, “and who require support and assistance with activities of daily living and 24-hour nursing supervision” in a safe and secure environment due to their medical, functional and/or cognitive disabilities (McGregor & Ronald, 2011, p. 5). Canadian aged 85 and over form the highest proportion of older adults living in LTC across Canada and it is expected that 4% of the Canadian older adults will be aged 85 and over by 2041 (McGregor & Ronald, 2011). Epidemiological trends also indicate that the number of older adults requiring relocation to LTC is expected to rise exponentially by 2041 from 200,000 beds to 320,000 (McGregor & Ronald, 2011). The LTC population has progressively become more frail and vulnerable resulting from the increasing clinical complexity of older adults with dementia, multiple comorbidities, and impaired mobility, making them more vulnerable to adverse events and increasing the demands on LTC to provide a safe environment whilst sustaining a high quality of care (McGregor & Ronald, 2011; Tideiksaar, 2010). This capstone paper on safety culture is therefore particularly pertinent to LTC and informs the need to create a safe and protective living environment to support people into old age (Scott, Hinginson, Sum & Metcalfe, 2010).

4.3. Falls: Most Common Adverse Events in LTC

The focal point of this capstone paper is on falls, a very serious and commonly reported, yet predictable and preventable safety issue. Falls are also known as “adverse events”, a term defined as “unintended injuries or complications that are caused by health care management, rather than by the patient’s underlying disease, and that lead to death, disability at the time or prolonged hospital stays” (Baker et al., 2004, p. 1678). It is widely recognized that older residents in LTC are more vulnerable and at higher risk of adverse events, particularly of falls and falls-related injuries (WHO, 2007). Although falls are most likely to occur when residents are transferring from one position to another, the current staffing ratio in LTC does not provide the opportunity to observe residents at all times, nor the support to assist residents when moving in and around the home, thereby putting their safety at risk (McGregor & Ronald, 2011). The risk of falls

among older residents is also compounded by medications, the physical and social environment, equipment and facility policies (Wagner & Rust, 2008).

As the most frequently reported adverse event in LTC, falls are a key concern in LTC safety culture (Wagner & Rust, 2009). In a typical LTC of 100 beds, a total of between 100 and 200 falls are reported annually (Tideiksaar, 2010). Typically residents living in LTC experience an average of 1.7 falls per year (CPSI, 2009). Approximately 50% of residents have at least another fall and over 40% of these residents have recurrent falls (B.C. Ministry of Health Planning, 2004; Cameron et al., 2010; Kiely, Kiel, Burrows & Lipsitz, 1998; Tideiksaar, 2010). The World Health Organization (WHO) also recognizes that falls are ubiquitous in LTC and a serious challenge for quality improvement (WHO, 2007).

Falls and falls-related fractures are also serious public health concern for older residents, their families and frontline health care professionals. Psychosocially, falls bring about significant emotional distress and post-fall anxiety to older residents, whilst subsequent restrictions in mobility can bring about social isolation, decrease in confidence, feelings of depression, loss of independence and thereby a decreased quality of life (Jung, 2008; Perez-Jara, Walker, Heslop & Robinson, 2010; Tideiksaar, 2010). Falls can also lead to increased concern and stress amongst family members which they can transfer to frontline workers which adds strain to the complexity of the management of falls (Tideiksaar, 2010). Preventing falls can be an emotionally and ethically challenging task for nursing staff who must balance the need to support residents' autonomy and quality of life with the need to ensure safety and reduce fall risk (Fonad, Burnard & Emami, 2008; Tideiksaar, 2010). Managing this can be a significant burden for nursing staff who can experience stress, guilt, and self-doubt about their ability to provide safe care, particularly when dealing with recurrent falls and people with dementia (Tideiksaar, 2010). Apart from the psychosocial costs, there are financial costs associated with falls including those arising from hospitalisation and the continued care required for those who have fallen (Hyatt, 2003; Tideiksaar, 2010).

Even though a systematic review of evidence-based practices recommends a multifactorial approach to fall prevention in LTC, the implementation of such an approach remains challenging in practice (Wagner & Rust, 2008). Residents in LTC have higher

care needs and more co-morbidities including dementia, putting them at higher risk of falls. Yet, human, physical and equipment resources in LTC are not designed nor equipped to meet the complex needs of residents. Staff to resident ratio has not increased hindering the ability to effectively respond to residents needs (McGregor & Ronald, 2011). Education on effective safety management is also lacking in terms of the translation of evidence-based practice. For example the use of physical and chemical restraints has been used in LTC with the assumption that these prevent falls and falls-related injuries despite the research being unequivocal that the removal of physical restraints can be done without increasing the risk of falls among older adults (Capezutti, Maislin, Strumpf & Evens, 2002).

4.4. Conceptualization of Falls

Safety research has conceptualized falls as the “manifestation of complex system failure” that requires the interplay of multifactorial interventions (Nowak & Hubbard, 2009, p.99). This conceptualization of falls highlights that fall prevention must occur at the organizational level through the implementation of key quality improvement strategies to prevent falls and falls-related injuries (Tideiksaar, 2010). The safety culture posits that LTC leadership and policy makers must be equally committed to prioritising falls prevention and in fostering an effective safety culture in LTC. Based on the definition of the safety culture, this means putting in place the following interventions at the organizational level: 1) creating learning opportunities through the implementation of an interdisciplinary team and problem-solving approach to safety and fall prevention; 2) improving communication processes and giving incentives for open reporting of adverse events; and 3) optimizing staffing resources (that is staffing levels by focusing on the recruitment and retention of qualified nursing staff) and the availability of fall prevention equipment and technologies (Tideiksaar, 2010; Wagner & Rust, 2008).

Viewed from a positivist perspective, the evidence-based fall prevention literature has primarily focused on identifying internal and external risk factors (Gillespie et al., 2003). More recently, organizational risk factors have also been explored to explain what causes falls to occur in LTC and emphasised the importance of a multifaceted and multidisciplinary team approach to ensuring safety for older residents (Tideiksaar, 2010). Despite these advancements, falls and fall-related injuries remain pervasive and a

serious challenge for quality improvement in LTC (Cameron et al., 2010; Gama et al., 2011; Neyens et al., 2011; Shanley, 2003; Tideiksaar, 2010). There is indeed very little research conducted thus far to create an innovative policy framework to successfully implement evidence-based fall prevention guidelines to improve the safety and quality of care of vulnerable older residents. LTC are also confronted with the dilemma of improving resident safety and preventing adverse events, while encouraging their autonomy and independence.

4.5. Key Issues and Gaps in Resident Safety in LTC

Understanding the current state of the art on resident safety is important to improve the safety and prevent adverse events among vulnerable older residents living in LTC. Expert researchers on safety from the Canadian Patient Safety Institute (CPSI) have identified a gap in the understanding of resident safety and emphasized key priority safety issues and prevalent adverse events that seriously hinder quality improvement (Wagner & Rust, 2008). In collaboration with the CPSI, Wagner and Rust examined the current state of the safety in LTC and identified twelve issues, gaps, and priorities in the literature on resident safety in Canadian LTC, which are listed and discussed below.

1. Safety research in LTC
2. Perceptions of staff and leadership on resident safety culture
3. Quality improvement and outcomes
4. Negative psychological issues from dementia
5. Balancing quality of life and safety
6. Staffing/human resources: knowledge, skills and training
7. Increasing clinical complexity of residents
8. Equipment and technology
9. Physical environment
10. Communication between management, staff, residents and families
11. Medication management
12. Restraints and dealing with complex behaviours.

4.5.1. Safety Research in LTC

A significant weakness in what we currently know about safety culture in LTC is that it is lagging behind the research conducted in other health care settings, particularly acute care environments (Castle, Handler, Engberg & Sonon, 2007; Castle & Sonon, 2006; Handler, Castle, Studenski, Perera, Frisdma, Nace et al., 2006). Despite the growing interest in the study of safety culture in healthcare research, there is little research on safety improvement and adverse events that occur in LTC. A significant amount of the scientific literature on safety in health care organizations focuses primarily on improving clinical outcomes in acute care settings (i.e., hospitals) and preventing adverse events such as medication errors (Castle et al., 2007). Yet, it is difficult to transfer the findings across acute and long-term care given the different organisational context. For example, the organizational and staffing structures in LTC differs from the one in hospitals in the sense that medical doctors are less present in LTC facilities, where nurses and care aides provide the bulk of the care (Bonner, Castle, Perera and Handler, 2008).

The safety culture in acute care and emergency hospital settings over the last few decades has primarily focused on clinical outcomes as opposed to the processes of care and created benchmarks and measurements of safety culture, particularly in the area of medication errors (Bonner, Castle, Subashan & Handler, 2008). Comparatively, the safety culture in LTC is considerably underdeveloped (Bonner et al., 2008). Bonner et al. (2008) have found that the frontline nursing staff working in LTC settings ranked consistently and significantly lower in 5 out of the 6 dimensions of an effective and proactive safety culture than those working in hospitals settings. Precisely, the dimensions where LTC settings lag behind are: 1) the failure to create an effective and proactive safety culture resulting in a culture of blame (Bonner et al., 2008). This punitive nature of LTC fosters an unease when reporting and discussing human errors (Bonner et al.). This is reflective of an ineffective safety culture and a negative attitude towards safety in LTC.

Bonner, Castle, Subashan and Handler (2008) also found a lack of communication between the nursing staff and management, whereby only “fifty percent of staff reported discussions with management to prevent mistakes, suggesting a

positive safety culture” (p. 22). Also, when nursing and nursing assistant staff reported errors in LTC settings, these were perceived as “personal attacks” and 20% reported feeling “punished” for their errors (Bonner et al., 2008, p. 22). This perception of safety culture reflects a culture of blame and a punitive approach to errors in LTC settings, which fails to create an open environment for reporting (Bonner et al., 2008). This perceived uneasiness to report errors or “adverse events” by the staff due to a perceived culture of blame, punishment and personal attack for making errors restricts opportunities for organizational learning and fails to create a supportive learning work environment (Bonner et al., 2008). Although in most studies, medical errors principally refer to medication errors, when applied to LTC this safety culture encompasses other areas of practice and care such as injury prevention. Rather a culture of blame is predicated upon a lack of resources, poor communication between the frontline staff and the leadership and an undertrained workforce.

These challenges in LTC contribute to creating a reactive safety culture whereby effective and evidence-based guidelines are only implemented when a near miss or injury has occurred. This is perhaps surprising given that LTC are considered high-risk health care organizations which are accountable for providing care to a group of older adults who are already at a higher risk of falls due to their physical, cognitive and/or sensory impairments. Adopting an effective safety culture in LTC, that is, one that meets the six dimensions of the safety culture described in the previous chapter becomes important in providing supportive settings that prevents risk of harm to a rapidly growing population of vulnerable older residents (Wagner & Rust, 2008).

4.5.2. Staff and leadership perceptions on safety culture in LTC

Essential in the understanding of safety culture, Bonner, Castle, Perera & Handler (2008) posit that the act of measuring safety culture could serve as a guide for the leadership in organisations to identify potential systems deficiencies. These measurements provide data that needs to be transferred into knowledge to improve existing safety strategies. In practice, this means evaluating the attitudes, perceptions, and working practices of frontline staff that provides direct care to older residents. Research on safety culture examined the perceptions of safety among different stakeholders in LTC and found a disconnect whereby frontline staff consistently reported

lower perceived safety than higher-level management (Wisniewski, 2007). Frontline staff reported less positively on three key issues: 1) the availability and appropriateness of staffing resources needed to create a safe environment for residents; 2) the level of supervision and support from management when reporting incidents and; 3) the extent to which adverse events are reported and analyzed for quality improvement (Wagner & Rust, 2008).

Castle & Senon (2006) suggested that there is an underdeveloped safety culture in LTC settings as they perform poorly across almost all the dimensions of safety culture, particularly in the failure to share a common belief towards safety and to create opportunities for teamwork and organizational learning. This phenomenon is reflected from the low scores in the safety culture assessment completed by frontline staff. Their perceptions about statements such as “we are actively working to improve resident safety, we see positive changes as a result of a mistake, we evaluate effectiveness after implementing change” resulted in lower scores compared to the administrators of LTC (Bonner, Castle, Perera & Handler, 2008; Castle & Sonon, 2006). Bonner et al. (2008) attribute this difference in the safety culture in LTC compared to hospitals as a result of diverging regulatory bodies. An accreditation process regulates the latter whereas the former are driven partially by a punitive regulatory environment that creates a culture of blame (Bonner et al., 2008). Additionally, the priorities in care delivery in hospitals differ, focussing more on reducing the length of stay, medication errors, and key performance indicators rather than the processes of care. Staffing differences between hospitals and LTC settings also vary in the amount of expertise and education training required, the hours of works and work satisfaction. Additionally, two out of five nurses reported a perceived fear when reporting adverse events as they were apprehensive about the response from management (Hughes & Lapane, 2006). This schism between frontline staff and management suggest the need to move away from a culture of blame towards a more committed approach to safety. This is important as described in one of the dimensions of a positive safety culture to foster an effective and proactive safety culture that is cognisant and committed to addressing issues at both the micro and organizational levels.

Buljac-Samardžić, van Woerkom & Paauwe (2012) studied the role of teamwork in creating a safe environment in LTC settings and argued that managers could develop

an effective safety culture by using a problem-solving approach whereby errors are openly discussed by team members and perceived as opportunities for organizational learning. Indeed, when leadership is not committed to transparency, a culture of blame is instilled and errors underreported. Similarly, research on safety in LTC also indicated that leadership must address ineffective communication and human resources issues that negatively impacted clinical outcomes and safety in LTC settings (Buljac-Samardžić et al., 2012).

4.5.3. Quality improvement and outcomes

Falls and falls-related injuries are quality indicators of resident safety. There is a positive association between the effectiveness in implementing fall prevention guidelines and clinical outcomes (Bonner, Castle, Perera & Handler, 2008). Falls prevention guidelines are now mandatory for accreditation. However, barriers such as poor staffing resources (high job turnover; excessive workload) in LTC are negatively associated with effective fall and falls-related injury prevention outcomes. These barriers result in the failure to successfully implement falls prevention guidelines (Resnick, Quinn & Baxter, 2004). An example of such challenge is the lack of time by nursing frontline staff to complete the risk assessment tool according to the fall prevention guidelines that is upon the admission of new residents into LTC and at the time of a fall. Unfortunately, other processes of care take the priority over safety and therefore safety of residents is undermined and not prioritized.

4.5.4. Negative psychological issues and resident safety

Given the higher prevalence of older adults with dementia in LTC settings, falls are the most commonly reported adverse events that can result in further disability, restriction of autonomy and in some cases, death (Oliveria, Liperoti, L'Italien, Pugner, Safferman & Carson, 2006). It is "estimated (that) 40% to 70% of (...) residents (in LTC) have Alzheimer's disease or some other kind of chronic organic mental illness (and that) at all stages of a dementing illness, behavioural problems are common" (Sloane et al., 1991, p. 1278). Tideiksaar (2010) indicates several other risk factors that are common among older residents with dementia which include: unsteady gait; wandering; experiencing two or more falls in the last three months; having Parkinson's disease and/or depression; using psychotropic medications and the use of restraints. All of these

risk factors put them at greater risk of falls which manifest themselves through impaired memory, forgetting safety precautions, impaired judgment and lack of insight, as well as the presence of aggressive behaviours (Tideiksaar, 2006). Wagner and Rust (2008) illustrate this phenomenon whereby an agitated and disruptive resident physically assaulted another resident, demonstrating the heightened risk arising from communal living in LTC. LTC are highly unpredictable and risky environment and this incident, which caused the death of the assaulted resident, comes to show the struggle of LTC organizations to manage incidents and to ensure public safety.

4.5.5. Balance between safety and quality of life

Another major issue regarding the safety in LTC is the need to strike a balance between safety and quality of life of LTC residents (Wagner & Rust, 2008). The quality of life of residents is particularly important in LTC, which represents the home or the living environment for residents. Deriving from a person-centered care model, older residents should therefore be encouraged to move around and make decisions with regards to their own freedom and autonomy. However, this represents a dilemma for frontline staff who is accountable for ensuring resident safety while needing to respect the human rights of the resident, even those with complex behavioural challenges (Tideiksaar, 2010). This struggle in maintaining a balance between the right for safety and autonomy indicates that the medical model of care has its value in ensuring the safety of older residents but that it must be combined with a person-centered care and thereby incorporate a holistic approach that respects resident's right for both, autonomy and safety.

Often, frontline staff struggles to respect residents' right for autonomy and choice to live at risk and to ensure that the safety measures are in place to prevent the risk of adverse events without impeding the quality of life of residents. By focusing solely on safety, the staff runs the risk of becoming overly paternalistic and of preventing freedom of movement in the name of safety (Wagner & Rust, 2008). In practice, the misuse of physical and/or pharmacological restraints in LTC remains an important public health issue, which is a paradox because it impedes the goals of LTC to preserve quality of life and maintain function and independence (Sloane, Mathew, Scarborough, Jaikishan, Koch & Tangen, 1991).

4.5.6. Staffing human resources, knowledge, skills and training

McGregor & Ronald (2011) affirmed that providing adequate staffing levels is the most important factor in quality of care and that higher staffing levels are positively associated with better health outcomes and less adverse events including falls. This demonstrates the importance of providing adequate staffing resources to optimize fall prevention as a quality indicator of clinical outcomes and to provide safe care to LTC residents. However, the Canadian Union of Public Employees (CUPE) reports that “staffing levels in Canadian LTC fall below and fail to meet the minimum staffing level of worked hours per resident day (hprd) to avoid jeopardizing the health and safety of LTC residents” (CUPE, 2009, p. 11). Indeed, the majority of the frontline staff in LTC settings are overworked, undertrained and underpaid. This makes it difficult for care workers and provides them less resources and incentives to provide safe care and best practices in dealing with challenging behaviours, dementia care, risk assessment and equipment use (Wagner & Rust, 2008). Given the clinical complexity of older residents in LTC settings, other challenges that affect resident safety include: staffing ratios, formal training and the recruitment and retention (Wagner & Rust, 2008). All of these issues and limitations affect residents’ safety and are organizational risk factors for falls.

Moreover, the difficulty in recruiting and retaining qualified health care professionals also negatively impacts resident safety in LTC (Wagner & Rust, 2008). The recruitment and retention of registered health care professionals are particularly challenging in LTC settings. Hence, frontline staff with lower educational credentials and lacking training is expected to provide care within limited resources, resulting in lower levels of job satisfaction. High job turnover and the reliance on casual staff contribute to poor teamwork processes and therefore team building is particularly difficult. Staff often works different shifts, causing lack of continuity of care between shifts and fewer opportunities for team-based learning on how to prevent adverse events (Buljac-Samardžic, van Woerkom & Paauwe, 2012).

4.5.7. Increasing clinical complexity of residents

LTC are home to a growing population of older residents who are living longer with a higher likelihood of comorbidities and physical, functional, behavioural and/or cognitive deficits (Wagner & Rust, 2008; WHO, 2007). While the clinical complexities of

residents have increased over time, this increase has not been coupled with an increase in staffing resources in terms of staffing levels, skills sets and knowledge on elder care. A challenge in LTC is that “staffing, equipment, infrastructure, policies and care models have not kept pace with residents’ needs” (CUPE, 2009, p. 10). Rather a less competent workforce dealing with a growing complexity of care currently impedes the safety in LTC representing a growing public health issue with policy implications (CUPE, 2009). This reflects a lack of prioritization of funding of the healthcare systems to address and resolve the safety concerns from inadequate staffing resources and inappropriate staff/resident ratios, especially when managing residents with complex behavioural issues (Wagner & Rust, 2008). The inability to provide optimal staffing capacity can be described as a latent system failure that causes harm to residents (Reason, 1997).

4.5.8. Equipment and technology

Recognizing that falls are preventable, the leadership of LTC must also strive to invest in creating a safe environment that maximizes the independence of residents while preventing the consequences of a fall when one inadvertently occurs. This can be achieved by ensuring the availability and maintenance of appropriate aids and adaptations that assist older residents to stand, transfer weight and ambulate around the care facility. Due to limited staffing training, the frontline staff may not always be trained in how to use the specific equipment or procedures for how to resolve defects in the equipment (Wagner & Rust, 2008). Researchers and partners of the Technology of Injury Prevention in Seniors (TIPS) project are investigating the potential of technological devices that aim to mitigate the consequences of falls: these devices include compliant flooring, hip protectors and wearable sensors to monitor and identify falls by residents (TIPS, 2013). However, gaps in government funding may result in a lack of investment in advanced safety equipment and technology that could improve safety and prevent harm (Wagner & Rust, 2008). Financial and physical barriers such as lack of resident/staff ratio and the lack of equipment or maintenance systems could also contribute to poorer quality outcomes for high-risk residents (Shanley, 2003).

4.5.9. Physical environment

Chaudhury, Mahmood and Valente (2009) recognized that the design of the physical environment (e.g. size of rooms and bathrooms, lighting, flooring) impacts on the safety of residents in LTC settings. Environmental hazards in residents' surrounding physical environment in LTC constitute significant risk factors for falls: poorly design and maintained equipment resulting in equipment issues such as malfunctioning or the misuse of bed, mobility aids, that is, wheelchair missing breaks or belts, high or unstable chairs without armrests (Shanley; 2003; Tideiksaar; 2010). Also, traditional LTC settings based on the medical model of care were designed to meet the needs of those who govern these institutions rather than those living in them. An illustration of such architectural designs include highly polished or waxed floors such slippery or wet floor surfaces, particularly in the main walking areas and around tub/shower floors, which could constitute risk factors in residents' physical environment and lead to slip and trips, especially for residents with poor gait and balance (Tideiksaar, 2010).

From a sociological perspective, Foucault has critiqued such architectural design in institutional care facilities and argued that it reflects a utilitarian approach, while referring to the concept of 'institutional maintenance', whereby the physical environment is designed to meet the needs and priorities of those who govern the institution (e.g. nursing and housekeeping staff to respectively allow them to run nursing carts from one room to another and clean the floor), rather than the needs of the residents themselves (Barry and Yiull, 2008). It is suggested that some of these design features can augment the risk of falls and falls-related injuries when compared to other types of flooring such as carpeting. Even though the latter has more of a home-like feature, it is not the choice of most LTC in which the focus is more on the processes of care than quality of care outcomes. More recently, research has focused on compliant flooring systems to provide a prosthetic physical environment that serve to mitigate the consequences of falls. However, more studies are required to evaluate their effectiveness and to support their implementation across all LTC.

4.5.10. Communication between management, staff, residents, and families

The current fall incident reporting systems in LTC do not provide opportunities for organizational learning or communicate appropriately any safety concerns among

different stakeholders. For example, there is a lack of discussion about high-risk residents between staff from one shift to another and little or no systems in place to investigate and analyze falls that are reported in LTC. Yet, the importance of monitoring and the open reporting of adverse events have been emphasized to improve the quality of care in LTC (Wagner et al., 2005; Silver, 1999). Wagner and Rust (2008) suggest that providing open, accurate and thorough documentation and investigation of adverse events is essential to prevent the reoccurrence of errors and to ensure adequate care for residents. Also, all stakeholders including family members must be informed about the condition of residents so that unsafe acts, such as transferring high-risk residents without sufficient training or supervision, are avoided. Wagner and Rust (2008) highlight that documenting any relevant information specific to new protocols, reporting any resident specific information and educating family about safety concerns contribute to preventing risk of harm to residents. Effective communication processes between different stakeholders is crucial in creating and maintaining an effective and proactive safety culture in LTC.

4.5.11. Medication management

Unlike fall prevention, medication management has been studied in healthcare research to ensure that the correct dosage is given to the correct person at the correct time (Wagner & Rust, 2008). However, the presence of undertrained staff, the lack of readily available medical and allied health care professionals (i.e., doctors and pharmacists) on-site in LTC and the lack of education about the impact of polypharmacy and of different types of medication are important safety concerns especially in LTC. Some of these medications such as antipsychotic drugs could cause residents to be at greater risk of falls, which must be communicated to ensure their safety as part of their care plan (Tideiksaar, 2010).

4.5.12. Restraints and dealing with complex behaviours

Through the implementation of the least restraint policy in health care authorities, the physical, environmental and chemical restraints are not used as frequently as previously in LTC. However, in practice, there is still a resistance to adopt the least restraint policy amongst both some staff and family members of residents (Wagner & Rust, 2008). Moreover, alternatives to restraints such as 1:1 supervision to agitated

residents or the use of equipment such as hip protectors and compliant flooring are sometimes limited due to funding issues and conflicting attitudes between residents, staff and/or families in support of these strategies (Wagner & Rust, 2008). When dealing with disruptive high-risk residents, it can be particularly challenging to reduce the risk of harm to these residents or other residents (Wagner & Rust, 2008).

Historically, severely cognitively impaired and high-risk residents have been and continue to be treated using both physical and or pharmacological restraints in LTC based on the assumption that using restraint protects residents from injuring themselves and health care providers and facilities from the risk of legal liability (Capezuti, Strumpf, Evans, Grisso & Maislin, 1998). However, the decline in the use of physical restraints such as belts and full bedrails from the implementation of public health policies, namely the Omnibus Budget Reconciliation Act, resulted in an increase in the use of pharmacological restraints such as sedatives in LTC (Zeisel et al., 2003). This has brought up several criticisms for its ethical issue related to the infringement of resident's right to autonomy, and due to their adverse consequences "including excess physical disability, more frequent falls, physiological consequences of immobility, and new or aggravated behavioural symptoms" (Capezuti et al., 1998; Sloane et al., 1991, p. 1278).

In contrast, physical restraints have been found to put residents at increased risk of falls, resulting in more serious fall-related injuries, sometimes causing death through suffocation or infection (Capezuti, Strumpf, Evans, Grisso & Maislin, 1998). Unlike the widespread belief that the removal of physical restraints will increase risk of falls and fractures, Capezuti et al. (1998) have reported that there is no evidence to support an increase of risk of falls or injuries after the removal of physical restraints and that restraints removal contributed to decreasing the risk of minor injuries due to falls in older residents in LTC. This comes to show that this measure does not demonstrate efficacy and is also ineffective in preventing falls and falls-related fractures. Yet, the use of both physical and pharmacological restraints continue to be used more often than required in the complex management of residents with dementia, particularly in LTC based on the medical model of care (Capezuti et al.; Sloane et al., 1991).

4.6. Summary of the Safety Culture in LTC

This review of the safety culture in LTC is a critical evaluation of the current gaps in LTC and provides the background on the importance of resident safety in decreasing adverse events, such as falls, and of creating an effective safety culture based on an open communication and learning supported by the management (Byrne, 2005; Wagner & Rust, 2008). Essentially, the research on resident safety in LTC implies that it is the failure to meet all the six dimensions of an effective safety culture that result in a poor safety culture in LTC which consequently lead to a higher prevalence of adverse events (Bonner, Castle, Perera & Handler, 2008). To restate these six dimensions are: 1) leadership commitment to safety; 2) open communication founded on trust; 3) organizational learning; 4) a non-punitive approach to adverse event reporting and analysis (based on a problem solving approach); 5) teamwork; and 6) shared belief about the importance of safety by all stakeholders (Halligan & Zecevic, 2011).

Conceptualized as the “manifestation of complex systems failures”, falls are caused by the twelve safety issues described in this chapter (Nowak & Hubbard, 2009, p. 98). Gaps in communication among staff and between staff and the leadership lack of reporting of error, ineffective teamwork environment, poor staffing with high turnover and lower job satisfaction lead to accidents, which are indicative of safety system failures. Zecevic, Salmoni, Lewko, Vandervoort & Speechley (2009) refer to these systems errors as “systems deficiencies”. Literature on safety culture indicates that a positive approach in dealing with such system deficiencies is to shift from one that blames individuals for systems errors to one where open communication and error reporting are seen as opportunities for organizational learning aiming to improve the quality of care of health care systems and prevent injury and harm (Bonner, Castle, Perera & Handler, 2008).

Much of this review supports the evidence that an effective or proactive safety culture not only serves to improve the safety of residents but also reduce the risks of adverse events such as falls among older residents (Wagner & Rust, 2008). The barriers to safety culture in LTC derive from both latent conditions and active failures in LTC organizations. Researchers that claim the importance of safety culture in LTC recognize the association between staff attitudes and behaviours towards safety and

resident outcomes and adverse events including falls (Bonner, Castle, Perera & Handler, 2008). This acknowledgment suggests that providing support to the frontline staff from the management through access to proper training and education and resources such as adequate labour power and equipment would enable the implementation of an effective and proactive safety culture.

Current literature on safety culture in high-risk organizations has shown significant progress in how these organizations manage their hazards and prevents adverse events. Lagging behind other health care organizations and even more so from HRO, LTC have yet to shift from a reactive approach to errors to a proactive one and still continue to face longstanding challenges to achieve an effective and proactive safety culture. In an attempt to bridge this gap, Wagner & Rust (2009) summarized the literature review of resident safety and identified twelve key safety issues, barriers and priorities to improve safety and prevent injury in Canadian LTC. The understanding of each of these concerns is important to identify policy priorities and implications to improve the resident safety agenda of Canadian LTC and to address the discourse on safety, quality of life and independence of older residents between different stakeholders (i.e., residents, families, frontline staff, managers and policy makers). The exploration of the issues in LTC safety demonstrates that the failure of identifying weaknesses in the six dimensions that constitutes an effective and proactive safety culture negatively influences resident safety in LTC settings (Bonner, Castle, Perera & Handler, 2008). More specifically, weaknesses in communication processes, lack of open reporting and disclosure, ineffective teamwork, lack of learning opportunities, poor staffing resources derived from lack of commitment to safety from leadership contribute to a poor safety culture in LTC. This highlights the need to identify priorities that optimize the safety culture in LTC, including the improvement of communication processes and staff education and retention in LTC settings (Wagner & Rust, 2009). Bonner et al. (2009) also posit that there is a positive association between safety culture and clinical outcomes among older residents in LTC settings. Therefore, addressing the key safety issues in LTC is essential for the development of procedures, policy and best strategies for high-risk practices to create high reliability LTC organizations.

In summary, two main key issues affect safety in LTC, namely 1) staffing/human resources and 2) communication processes (Wagner & Rust, 2009). To address these

two issues, Wagner & Rust (2009) have suggested creating collaboration between health and educational institutions by including safety awareness in the health care curriculum and advocating for government funding for registered human resources to decrease risk of adverse events, promote mentorship and training on how to provide safe elder care and leadership to empower and educate LTC staff on how to create an effective and proactive safety culture. This chapter has reviewed the gaps and issues in the LTC safety culture. The next chapter will shift gear and focus on a successful industry, namely the commercial aviation industry, which has achieved excellent safety standards with the hope of translating their lessons to improve the safety culture in LTC.

5. Safety Culture inn Aviation

It is now common to view healthcare as a safety critical industry, hence the increasing comparison with, for example, [the] aviation industry with regard to learning lessons to enhance safety. It is acknowledged that healthcare faces some unique problems (Reason, 2004), but the similarities outweigh those differences in terms of creating a safety culture. (Milligan, 2006, p. 96)

5.1. Comparison between the Aviation industry and LTC

In identifying the weaknesses and limitations in the safety culture in LTC organizations, there is a need to investigate an industry where high levels of safety have been achieved, namely the commercial aviation industry. Safety concerns have always been paramount in aviation resulting in a plethora of safety strategies to ensure the security of the lives of millions of passengers flying daily around the world (Lewis, Vaithianathan, Hockey, Hirst & Bagian, 2011). Though it lies outside of the realm of the health care system, the commercial aviation industry has achieved excellent safety performance, providing the potential to translate important lessons to improve safety in health care organizations and reduce the risk of harm and injury from service delivery (Hudson, 2003). The aviation industry and LTC share the commonalities in that they are both complex organizations governed by licensed human beings who work in teams with advanced technology and where there are multiple threats and risks of harm to those they serve (Helmreich, 2000). Both organizations are highly unpredictable environments where systems failures can occur with possible devastating adverse events. This chapter explores the key changes that enabled the commercial aviation industry to establish high level of safety standards, leading to the development of a proactive safety culture and the recognition as a High Reliability Organization (HRO). Recall that HRO are high reliability organizations with extremely safe and resilient systems in place to manage errors, mitigate their consequences and prevent adverse events (Reason, 1997).

5.2. History of the Commercial Aviation Safety

To set the stage for the exploration of the safety culture in commercial aviation, this section provides an overview of the historical context of aviation safety and some of the critical events that stimulated improvements in aviation safety. This section answers the following question: What led the commercial aviation industry to become an ultra-safe industry? The choice of exploring the safety culture of the commercial aviation industry was guided by the fact that like the general public, most readers can relate to this industry from traveling at least once by air and share the collective interest and positive attitude towards flying safety. Due to the speed, high altitudes and the presence of inflammable materials, airplane crashes have almost always been disastrous (Hudson, 2003). In the late 1950s to 1960s, catastrophic aviation accidents rapidly generated immense political, social and commercial concern (Hudson, 2003). This concern arose from the human and financial costs of airplanes, including the dramatic loss of life and subsequent liabilities coupled with the intense media coverage surrounding airline accidents worldwide. All this led to the prioritization of public safety in the commercial aviation industry. At this time, it was estimated that the exponential growth of the commercial aviation industry coupled with the predicted increase in the air traffic would raise the frequency of accidents due to the heightened risk of airplane collision (Wiegmann & Shappell, 2003). This stimulated debate on how best to reduce the risk of accidents in the aviation industry.

5.2.1. Mechanical designs features and environmental conditions

In the early years of aviation history, the poor maintenance and the features in the design of aircrafts resulted in mechanical failures that were responsible for the majority of the aviation accidents, especially under bad weather conditions (Wiegmann & Shappell, 2003). For example, the feature of cockpits designed for the World War II planes contributed to pilot errors because of their layout including the positioning of the flap and landing-gear handles located next to one another, causing confusion and leading to accidents (Dekker, 2005). Conducted over the last half a century, rigorous engineering investigations of air crashes linked to mechanical designs features and environmental conditions led to technological advancements and the creation of ultra-safe modern aircrafts. Revolutionary changes in the design of the contemporary aircraft

created redundant safety solutions and effective intervention strategies to prevent mechanical failure or to mitigate their consequences when they occur (Wiegmann & Shappell, 2003). The regimentation of standardized operational procedures in the aviation industry has also required airlines to abide by rigorous equipment certification processes based on strict safety standards (Hudson, 2003).

5.2.2. Human errors

As the modern aircraft became much safer in its design and mechanics, unsafe acts from the aircrew were deemed more problematic (Wiegmann & Shappell, 2003). Aviation accidents were increasingly attributed to errors or unsafe acts posed by humans due to their physiological and psychological limitations (Helmreich, 2000). This term was called “human error”, “pilot error” or “breakdown in the CRM” (Crew Resource Management) (Dekker, 2005, p. 6). The observations of aircrew demonstrated that fatigue, workload, fear and stress under high-risk situations, lack of compliance with procedures, ineffective communication processes and information processing, lack of technical proficiency, poor interpersonal skills, and flawed decision-making contributed to errors (Helmreich, 2000). Investigations into the factors contributing to catastrophic aviation accidents recognized human performance failure as an issue and the importance of effective teamwork for error management in complex and high-risk organizations including in the aviation industry (Helmreich, 2000).

In the summer of 1908, in Virginia U.S., an airplane crash resulted in the tragic death of an aircrew still in training, thereby marking what was at the time the most fatal aviation accident (Wiegmann & Shappell, 2003). In February 1991, an US traffic controller gave the signal to an airplane operated by Skywest Airlines to take off in Los Angeles, and shortly after, to the US Air Boeing 737 to land on the same runway (Kosnik, Brown & Maund, 2007). This fatal collision caused a fire and resulted in the death or injury of dozens of passengers on board of the US Air Boeing and the loss of the entire crew and all passengers on board of the SkyWest aircraft (Kosnik, Brown, & Maund, 2007). Among many other aviation accidents, the worse accident in the history of aviation occurred in March 1977, in Tenerife on the Canary Islands, when the Pan American 747 and a KLM 747 collided on the runway and killed 583 people out of the 644 on board (Doucette, 2006). This disastrous collision resulted from the

miscommunication between the KLM captain and the air traffic control tower, exacerbated by the failure of the first captain to intervene despite his awareness of the miscommunication because of his fear of reprisal from his senior captain (Doucette, 2006). The air crash of the Boeing 737-400 was a disaster where the pilots were partially blamed due to their inability to attune to the layout and configuration of the aircraft, which was different to the model they were familiar with (Lewis, Vaithianathan, Hockey, Hirst & Bagian; 2011).

5.2.3. State of the modern commercial aviation industry

Since the late 1950s, rigorous research on aviation has yielded the achievement of unparalleled standards of safety around the world resulting from insight into how and why they occur. To date, the accident rate in the commercial aviation industry has reduced significantly with less than two accidents occurring worldwide for every one million departures (Wiegmann & Shappell, 2003). It is with much confidence that researchers on aviation safety claim that flying via a commercial aircraft is one of the safest mode of transportation and likely much safer than rushing to the airport in a taxi in a bustling city (Fromm, 1968; Hudson, 2003; Lewis et al., 2011; Wiegmann & Shappell, 2003). The trend of the overall (top) and fatal (bottom) commercial air carrier accidents worldwide held between 1961 to 1999 (see Figure 5.1) indicates the drastic decline in the rates of overall and fatal aviation accidents per millions of departure since 1961 (Wiegmann & Shappell, 2003, p. 3).

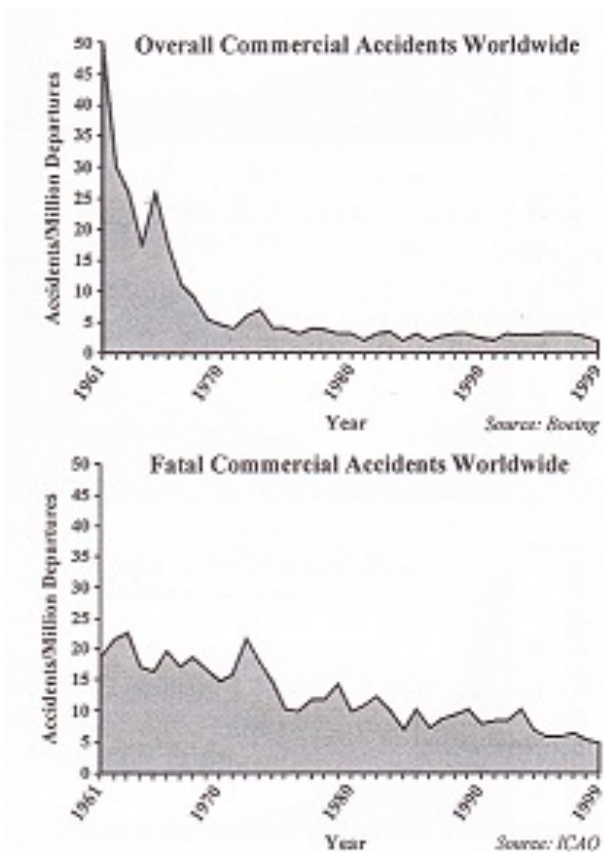


Figure 5.1. Comparison of Overall and Fatal Commercial Accidents Worldwide

Note. Reprinted with permission of the Publishers From "The overall (top) and fatal (bottom) commercial air carrier accidents worldwide 1961- 99" in *A Human error approach to aviation accident analysis: The human factor analysis and classification system* by Douglas. A. Wiegmann & Scott A. Shappell. (Farnham: Ashgate, 2003), p. 3. Copyright © 2003.

The Figure 5.1 demonstrates that the commercial aviation industry has made significant advancements towards creating a safe environment that prevents errors and mitigates the consequence of adverse events. The following example illustrates one of the success stories in the aviation history in 2009. With the provision of advanced training, the pilot prevented an air crash and landed in the Hudson River while ensuring the safety of all with no loss of human life reported. Further investigations of this incident showed that the principle cause was a bird strike, a term that describes birds getting into the engine, which led to subsequent design changes and safety operational procedures to prevent the reoccurrence of aviation accidents due to bird strike.

5.3. Investigations of Aviation Accidents

Given the potential for catastrophe in high-risk complex organizations, in-depth investigations of aviation accidents are extremely important in preventing re-occurrence (Wiegmann, Zhang, von Thaden, Sharma & Gibbons, 2004). Improvements in aviation safety have been systematically formalized through the safety guidelines and rigorous engineering investigations of the Federation of Aviation Administration (FAA). In 1959, the FAA was established to develop standardized and rigorous methods for accident investigations, documentation, dissemination of errors and the formulation and enforcement of air safety regulations and lessons to improve aviation safety worldwide (Fromm, 1967). With the serious attention given to aviation safety globally, each country implemented a National Transportation Safety Board (NTSB) responsible for national accident investigations to identify safety errors and risk, share knowledge, and suggest interventions to enhance safety and adopt safety guidelines (Zecevic, 2009). The NTSBs were established internationally to host the engineering investigations database of all aviation accidents, providing rich information to be used in the research and development of safer aircraft. These rigorous investigations of catastrophic adverse events over the past few decades have enabled the commercial aviation industry to ensure that risk of errors and harm is minimal (Wiegmann & Shappell, 2003). This has provided an understanding of the causes the airplane crashes, and has led to the implementation of practical lessons such as standardized operational strategies to improve aviation safety worldwide.

5.4. Lessons from the Safety Research in the Commercial Aviation Industry

Another question that one poses is: “what did the commercial aviation safety do to become safe?” In other words, what are the factors that contributed to an increase aviation safety since 1960’s? Aviation researchers posit that the answer to this question lies in the positive attitudes towards safety and the effective management of error (Helmreich, 2000; Hudson, 2003). Recognizing the complexity of their organization and the high risk of error and threat to the lives of passengers and pilots, the commercial aviation industry has always been concerned about safety and committed to addressing the different factors that impact aviation safety and risk management. This industry took

proactive measures by changing the conditions under which humans and technology would interact to prevent and mitigate errors (Helmreich, 2000; Reason, 2000). More specifically, the aviation industry has embraced the six dimensions of safety culture into their own culture by empowering and educating their entire staff, from the leadership to the frontline staff, about the importance of safety, effective teamwork and communication processes, and by fostering an informed culture based on organizational learning.

Research on the human factors of risks conducted since the 1940s in the aviation industry led to the development of a systems approach, witnessing significant improvements in fostering a proactive safety culture (Wilf-Miron, Lewenhoff, Benyamini & Aviram, 2002). The investigations of catastrophic accidents linked to human error were necessary to learn from past errors and led to the development of rigorous standards expected of all actors involved in the system, including pilots and engineers (Helmreich, 2000). The implementation of systematic safety regulations formally and systematically addressed three components that impacted aviation safety: 1) the aircrew (through rigorous licensing, comprehensive training; emphasis on teamwork; transparent communication; and an informed and reporting culture); 2) the aircraft (maintenance standards and design of high reliability technologies); and 3) standardized aircraft safety operating procedures (Lewis, Vaithianathan, Hockey, Hirst & Bagian, 2011).

5.4.1. Lesson 1: Systems approach for error management

Key to the achievements of excellent safety standards in the commercial aviation industry is the adoption of a systems approach (Hudson, 2003). This approach recognizes that errors are inevitable, that there are intrinsic characteristics of high-risk human-technology driven industries that derive from faulty system design, not from human negligence (Milligan, 2006; Reason, 2000; Wilf-Miron, Lewenhoff, Benyamini & Aviram, 2002). This philosophy of error management in aviation took proactive measures to change the conditions under which humans worked to create safety defense mechanisms to prevent the risk of errors (Reason, 2000). This came from the recognition that if errors were not corrected, they could result in adverse events (Helmreich, 2000). This motivated the commercial aviation industry to develop a proactive safety culture to mitigate the systemic errors including redundant safety

solutions, checklists, standardization of operational procedures and training in effective communication and teamwork (Wilf-Miron et al., 2002).

Although historically aviation accidents were explained by the mechanical failure of unsafe aircrafts, years of investigations into the modern aviation safety reveal that 70% to 80% of aviation accidents can be partially explained by human error (Wiegmann & Shappell, 2003). In other words, this industry acknowledged the stance that “to err is human” (Kohn et al, 2000). Shifting away from a culture of blame, the model of error causation based on a systems approach explained that errors are the consequences or the manifestation of complex systems failures (latent conditions), rather than caused by humans (Reason, 2000). In other words, this means that humans inherit systems defects. This philosophical approach to error causation and management acknowledged the presence of active failures, that is, the limitations of the human cognitive processes when working under the influence of stress, fatigue and distractibility in a high-risk work environment (Helmreich, 2000). Reason (2004) used the term “error wisdom” to explain this process, whereby the aviation industry became cognisant of its vulnerability to errors in a high-risk environment. This recognition has led to the establishment of standardized procedures and mandatory training encompassed in the Crew Resource Management (CRM).

5.4.2. Lesson 2: Training in effective teamwork and communication

Recognizing the threat to human lives including the ones of passengers and pilots in the commercial aviation industry, a key safety lesson has been the effective management of error through extensive and comprehensive training based on the principles of safety at all cost. Investigations showed that most airline accidents were not caused by human technical deficiency or mechanical failure, but rather linked to the flight crew’s failures in communication, leadership, and teamwork, that is, failure to use all the available resources to solve problems effectively while in flight (Helmreich, 2000). The commercial aviation industry recognized that in addition to technical training, the aircrew also needed training to improve how they worked together as a team (Mann, 2004). Milligan (2006) highlighted the importance of a team-based learning approach to safety improvement in high-risk industries. Knox (2003) showed that pilot’s attitudes and perceptions of their interpersonal interaction on the aircraft was a predictor of high

performance and could be improved through training in team performance. Research in the aviation industry also identified effective communication processes and teamwork as being coping processes that affect the ability to work together to ensure safety when identifying problems and making complex decisions (Helmreich, 2000).

The FAA therefore mandated the development and deployment of the Crew Resource Management (CRM) training program to ensure safe and effective flight operations (Fromm, 1968). The CRM, a standardized training program for all pilots, was designed to improve the recognition and utilization of all available resources (information, equipment, and people) to ensure the safe operation of an aircraft (Lewis, Vaithianathan, Hockey, Hirst & Bagian, 2011). This extensive training looked beyond the technical aspects of flying, emphasizing the importance of human performance and providing strategies to prevent errors including the need for effective interpersonal skills when communicating with team members to prevent error. Formal CRM training in practicing effective teamwork and identifying the limitations of human performance have been implemented to foster positive attitudes and improve the actions of crewmembers to ensure safety during flight operations (Doucette, 2006; Helmreich, 2000). Safety training emphasized the importance of positive attitudes towards safety and the development of a decision-making culture based on mutual trust and open communication.

The aviation industry understood that human error could be addressed through redundant solutions and regimented practices to control and compensate for human error. *Cross-monitoring* and *situational awareness* are examples of effective team processes to ensure safety. *Cross monitoring awareness* consists of following specific standards and operating procedures and verifying the work of others through safety checklists. *Cross-referencing* is a term that describes the process of double-checking high-risk work and verifying or correcting inaccurate or ambiguous information, such as checking whether doors are closed prior to departure. Standardized operating procedures have been implemented requiring pilots to follow regimented procedures, such as completing three types of *checklists* while in flight (Lewis, Vaithianathan, Hockey, Hirst & Bagian, 2011). These checklists are closely monitored after each flight and deviations from the norm are sanctioned. These checklists include: 1) read-to-do used only in unusual circumstances, that is at the time of or after an accident to prevent

relying solely on memory; 2) challenge and response checklist during routine events (after take-off and between two pilots to ensure all safety is initiated); 3) aide-memoire (a pre-departure briefing) to ensure all safety tasks are completed (Lewis et al., 2011). Following these checklists pilots are required to cross-reference each other's work without fearing threat to their hierarchical position.

Aircrew was trained to follow a script, i.e. predetermined set of communication standards and expectations, in case of emergency. *Situational awareness* refers to teaching aircrew and pilots to be mindful that error could happen at anytime and to always remain vigilant of the situational context of the aircraft, for example, awareness and reaction to near misses and early identification of 'in-the-moment' errors that can result in an accident. The CRM also provides training in *interpersonal communication skills* to improve the sharing of information across the team. This includes encouraging lower level staff to vocalize their concerns if they feel action is needed to avert a potential crisis situation (Lewis, Vaithianathan, Hockey, Hirst & Bagian, 2011). This challenges the traditional hierarchical situation that often exists in complex organizations i.e. real and perceived lack of power that lower level staff feels they have to voice their concerns and have them acted upon.

Leadership in the aviation industry has demonstrated a *corporate responsibility for training the aircrew* (Lewis, Vaithianathan, Hockey, Hirst & Bagian, 2011). All airlines meet the logistics and cost of training with pilots being provided with time allowance to attend formal training sessions. These training sessions are mandatory and a close record of attendance and renewal dates is maintained with strict sanctions imposed when a pilot fails to abide to these mandatory requirements (Lewis et al., 2011). In ensuring rigorous safety standards, the CRM also requires that all pilots' undergo annual reaccreditation through a demonstration of competency (Helmreich, 2000; Lewis et al., 2011). Pilots trained in the commercial aviation industry are expected to be re-certified annually and must undergo a thorough medical examination. They are also expected to spend a number of hours in a sophisticated simulator before being exposed to the real-life environment in order to obtain feedback on their technical proficiency and their interpersonal skills when working as a team (Helmreich, 2000).

To monitor and investigate communication processes in flight, the *black box* has also been implemented in airplanes worldwide (Lewis, Vaithianathan, Hockey, Hirst & Bargian, 2011). Communications between crewmembers and pilots are automatically recorded and monitored. In the event of an air crash, this information remains intact and is investigated for safety improvement purposes. This allows reconstructing what happened at the time of the incident and to identify safety deficiencies or errors that we can learn from.

5.4.3. Lesson 3: Standardized operations based on positive attitude towards safety

In creating a positive safety culture, regimented safety procedures must be adopted by all aircrew, management team and engineers working in the commercial aviation industry (Hudson, 2003). Over the years, safety has become ingrained in all flight procedures, not only in the actions of aircrew but also for passengers on what to do in the event of an emergency (i.e. putting an oxygen mask on before trying to assist others) (Lewis, Vaithianathan, Hockey, Hirst & Bagian, 2011). Aircrew have also learnt to rigorously follow a set of clear and standardized requirements without fear of being reprimanded. The *sterile cockpit rule* was implemented and required that all pilots and cabin crew refrained from engaging in nonessential activities (such as talking about things not related to flying) during safety critical phases of a flight (Lewis et al., 2011). This safety strategy was implemented with warning and alarm systems placed in all aircrafts to prevent distraction when concentration is required especially during safety-critical situations such as under bad weather conditions.

Pilots and engineers have also been licensed to ensure that their working hours are consistently and safely regulated. This includes a concept known as the *minimum safety requirement* (Lewis, Vaithianathan, Hockey, Hirst & Bagian, 2011). This means that pilots are only entitled to a specific and evidence-based amount of work hours allowed to fly safely and there is also a set minimum number of competent staff ratio available per passengers and aircraft size (Lewis et al., 2011). Pilots are given an expected amount of hours to work per month and must abide to a set amount of rest in between each flight. A strategy called *alternation of roles* is also in place whereby captains and first officers must typically alternate between flying and non-flying duties for each segment of their flight (Lewis et al.). This strategy was implemented to promote

team cohesion and flatten the hierarchy between pilots with different levels of seniority. *Joint safety briefings* are another safety strategy to ensure that knowledge is effectively shared in the aviation industry (Lewis et al.). These meetings involve gathering the entire crew before each departure and include an educational update on a safety topic where each crew member is required to read and sign any safety notices which may pertain to potential hazards on their route or potential issues with their particular aircraft (Lewis et al.). This provides opportunities for evidence-based organizational learning and dissemination of knowledge information on safety and also ensures that all crew are up-to-date and committed to safety procedures.

5.4.4. Lesson 4: Advanced and high-reliability technology as defence mechanisms

Although the technological aspects in aviation and LTC organizations are divergent, it is conceptually useful to consider the design aspects of LTC that could be improved to ensure the safety of residents. Recognizing the extent of the contribution of human error to accidents, the equipment in aviation was engineered based on the ergonomic principles of safety by design (Lewis, Vaithianathan, Hockey, Hirst & Bagian, 2011). The advancement of avionics, such as the transition from propeller aircraft to jet engines, is a major contributing factor that makes the current aviation industry safe. Deriving from the lesson that “design influences human performance”, the commercial aviation industry engineered effective design changes in the aircraft to enhance safety performance and prevent error (Decker, 2003, p. 2). The aircraft equipment has been designed to compensate for any potential human error and requires undergoing rigorous certification and maintenance (Hudson, 2003). From years of research on aviation safety, a worldwide safety strategy implemented in all aircraft requires a standard layout for the equipment in the cockpit and the requirement that all pilots are trained on how to use the equipment across different airlines, a term called *type conversion* (Lewis et al., 2011).

Keeping safety in mind, the ergonomic principles of safety by the aviation industry implemented three safety strategies. These three safety strategies are: 1) *Mistake-proofing*; 2) *Forcing functions*; and 3) *Flight envelope protection* (Lewis, Vaithianathan, Hockey, Hirst & Bagian, 2011). *Mistake proofing* refers to designing a system so that the user finds it difficult or impossible to make a mistake (Lewis et al., 2011). This aimed

to prevent human errors caused by memory, lack of experience, and inattention due to fatigue/stress or overload. For example, the landing gear in the Boeing 747's is automatically locked in the down position when the airplane is on the ground (Lewis et al.). *Forcing functions* illustrates the notion of how the design of the equipment tries to correct human errors as they occur including features such as the Traffic Alert and Collision Avoidance System that provide information and warning about the presence of any aircraft within its vicinity. When the system detects that two planes are on course for a midair collision, it calculates a set of avoidance maneuvers which it orders the pilots to follow (Lewis et al.). The *Flight Envelope Protection* consists of sets of limits on the controls of aircraft that prevent pilots from commanding a plane beyond its operating limits (Lewis et al.). The purpose of this is to liberate pilots to use maximal control forces in emergency without endangering the safety of the aircraft by their actions.

**5.4.5. Lesson 5:
Non-punitive approach to adverse event reporting and analysis**

Very early on, the investigations of the aviation accidents acknowledged that pilots, like any humans, were highly fallible (Reason, 2000). Given the potential for catastrophic damage that failures of high-risk systems engender, the investigation of the causes of system failures is extremely crucial and yield rich data to improve safety margins and prevent occurrences (Wiegmann, Zhang, von Thaden, Sharma & Gibbons, 2004). Moving away from a culture of blame, the aviation industry recognized that safety is dynamic not static and that accident could be prevented with an ongoing process of adverse event reporting and investigations (Hudson, 2003). Pilots and crewmembers have been encouraged to report adverse events without fearing punishment or appraisal from others and to consider open and full reporting to provide opportunities for organizational learning (Hudson, 2003). This meant adopting a proactive stance to safety based on a problem-solving rather than problem-raising or blaming approach. The aviation industry implemented incentives including *anonymity* and *immunity* to encourage reporting of any unsafe situation with upmost confidentiality (Lewis, Vaithianathan, Hockey, Hirst & Bagian, 2011). This strategy is called *incentivized no-fault reporting* whereby pilots are given ten days to report the occurrence of an unsafe act, and thereby demonstrate a constructive approach to problem resolution without the pilot fearing penalty (Lewis et al., 2011).

In summary, the commercial aviation industry has become safe because of its adoption of a proactive safety culture. It has incorporated the following six dimensions of a positive safety culture in its philosophy of error management, namely: 1) leadership committed to safety; 2) open communication founded on trust; 3) organizational learning; 4) non-punitive approach to adverse event reporting and analysis; 5) teamwork and; 6) shared belief in the importance of safety. The positive attitudes and management of errors based on a systems approach encompassed several lessons impacting on aviation safety: 1) acknowledgement of human error; 2) training in effective teamwork and open communication; 3) advancement in aviation ergonomics through high reliability technology; 4) operationalization of regimented safety procedures; and 5) and a clear and transparent reporting culture. The systems approach addresses all the processes (human, technological, procedural and managerial) impacting on safety to manage and mitigate risk of error (Reason, 2000). This realization identified that beyond making equipment and procedures safer, the provision of knowledge and training can foster positive attitudes and behaviours that maximize safety and create a safe work environment. This chapter has shown that high-risk and complex organizations such as healthcare settings have much to learn from the mistakes and lessons learnt by the aviation industry (Milligan, 2006). This statement supports the need to expand to lessons already learnt from other high-risk industries that are safety critical.

5.5. Conceptual Framework: Error Management and Prevention in Aviation

Lewis, Vaithianathan, Hockey, Hirst & Bagian (2011) developed a conceptual framework aimed at protecting aircrew and pilots while preventing errors. Lessons that the commercial aviation industry learned centred on three key safety principles, which are: 1) counter heroism, that is, the recognition of human error and an emphasis on teamwork and a systems approach; 2) common knowledge (that is the dissemination of safety information); and 3) ergonomics (that is promoting safety by design). Several safety initiatives were implemented to alleviate the responsibility on pilots that emphasized the role of teamwork and the systems approach to improving safety (Lewis et al., 2011; Reason, 2000). Based on the premise that error prevention derives from lapses in safety standards and measures, Lewis et al. (2011) explored the safety

strategies that the commercial aviation industry has routinely adopted to enhance safety and to prevent the risk of adverse events. Consequently, airline passengers are now protected by a vast array of advanced safety lessons including methods of communication, teamwork, the implementation of ultra-safe aircraft designs, the adoption of regimented safety procedures in the work environment and the promotion of an open reporting culture (Milligan, 2006).

6. Discussion

This capstone paper has defined the emerging concept of safety culture and critically examined the current state of safety culture in LTC and the admirable safety culture in the commercial aviation industry. Much of this review discussed the gaps in LTC in achieving desirable safety benchmarks and its resulting creation of a reactive safety culture. It can be argued that the weaknesses and gaps identified to provide safe care to frail and vulnerable older adults derive from the failure of LTC to effectively incorporate the six dimensions of a positive safety culture into their own culture and that this failure affects their ability to manage the risk and mitigate the consequences of adverse events. This review suggests that LTC must thrive to implement the six dimensions of a positive safety culture into their value systems, procedures and processes of care to improve the safety outcomes, reduce the risk and consequences of falls and thereby move towards a proactive safety culture. This explorative analysis has demonstrated the need to improve the state of safety culture in LTC to enhance the safety and prevent the risk of adverse events among older residents. This analysis has shown that LTC have much progress to make to improve their safety benchmarks and to achieve the proactive safety culture enjoyed by the commercial aviation industry.

Drawing from a culture of blame instead of a systems approach to error management, three main issues in LTC were identified from the inability to successfully implement fall prevention guidelines in practice. Firstly, there is a disjoint and lack of awareness about the safety priorities and issues between the management and the frontline staff. Secondly, this ineffective communication processes and teamwork between the managers and frontline staff are exacerbated by the lack of a cohesive and team-based working environment leading to difficulties in staff recruitment and retention. Thirdly, there is a lack of opportunities for organization learning due to the fear of disclosure from the predominant culture of blame and poor investigation systems in

place to learn from previous adverse events. All these safety gaps and issues result in the absence of an informed culture in LTC.

Recognized as a HRO, the commercial aviation industry has more recently been studied to guide the safety research and to create safe health care organizations. Research has shown that the commercial aviation industry is reflective of a proactive safety culture and suggested that the understanding of their key guiding safety principles could potentially be translated to the health care system with the objective of transferring their lessons to ensure the safety of residents living LTC (Wilf-Miron, Lewenhoff, Benyamini & Aviram, 2002). This analytic review has also described how the adoption of positive attitudes and a systems approach by the commercial aviation industry facilitates the management of the risks and consequences of errors in high-risk organizations (Hudson, 2003; Reason, 2000). It can be argued that some of the lessons could be applied from the commercial aviation industry while others may not be applicable due to the differences in their structures and designs.

6.1. Comparison between Aviation and LTC

Despite the differences between the commercial aviation industry and LTC, this discussion explores some of the lessons that could be translated to LTC from the rich history of aviation safety to prevent and mitigate errors (Thomas, Sherwood & Helmreich, 2003). The comparison between the LTC and the commercial aviation industry upholds because the risk of harm in these two organizations is costly and has devastating physical, psychological and financial consequences. Safety is therefore a paramount issue in both of these organizations and a major public health and policy concern. Considered as complex systems that involve the interaction between licensed human beings with advanced technology, both organizations aim to ensure the safety and to prevent harm by their processes of care delivery. The presence of adverse events in both of these organizations and accidents has been attributed to the failure of the whole systems or organizations to meet the six dimensions of safety culture, rather than human error or negligence.

Based on the systems approach, adverse events in both of these organizations are caused by systems failures or latent conditions, including poor staff training on the importance of safety, lack of support from the management to ensure safety, ineffective

communication processes and teamwork, and ineffective reporting culture resulting in the loss of opportunities for organizational learning. LTC also prioritizes other aspects of care than the safety and security of residents. In contrast, in light of the dramatic losses of lives and the resulting mediated political, social and commercial concern on public safety, the commercial aviation industry must prioritize the safe management of errors. The application of safety operational strategies into the very core of all their tasks to manage the risk of error explains the significant drop in the commercial aviation industry. When comparing the modern aviation to the healthcare, the rate of errors reported in the commercial aviation industry is less than 0.1% when compared to at least a minimum of 1.0% up and above in healthcare with even higher rates in some specific clinical environments (Milligan, 2006). The rate of death between the modern aviation is of one passenger's life lost per 10 million flights and is by far less than the ones in the health care, that is, one iatrogenic death for every one hundred to three hundred hospital admissions (Lewis, Vaithianathan, Hockey, Hirst & Bagian, 2011, p. 5).

6.2. Transferability of the Aviation Lessons to LTC

The key achievement of this project has been to compare two different industries and it was hypothesized that there are some potential lessons to be learned and a valuable next step would be to identify key strategies that could be effectively developed from the aviation model. Falls are the most commonly reported adverse events in LTC and a complex issue that requires a discussion of how to prevent these in LTC and of the challenges of doing so. Falls has been conceptualized as the “manifestation of complex systems failures” (Nowak & Hubbard, 2009, p. 98). As illustrated by the Swiss Cheese model by Reason (1997), failure of complex systems is not caused by one identifiable factor but rather by latent conditions and the cumulative effect of many small “holes” that align together (Nowak & Hubbard, 2009). This conceptualization of falls has practical implications for the prevention and investigation of falls and supports why current evidence-based multifaceted interventions alone are not always conducive to fall prevention. Instead, it emphasizes the need for a comprehensive systems approach where the entire health care system works together to promote safety.

Over the years, the commercial aviation industry has implemented rigorous and standardized safety operational strategies worldwide (Lewis, Vaithianathan, Hockey,

Hirst & Bagian, 2011). Lewis et al. (2011) described three core safety themes that form the conceptual framework upon which aviation safety is based. It is here discussed that these three safety themes have practical implications to prevent injury and improve the safety in LTC. These three core safety themes are: counter heroism, common knowledge and ergonomics. Each of these safety principles is here explained on how they relate to fall prevention in LTC.

6.2.1. Counter-heroism

The first safety concept from the aviation industry is the recognition of the importance of teamwork and a systems approach rather than placing safety as the sole responsibility of frontline staff (i.e., pilots/aircrew or nurses/care aids), a concept known as *counter heroism*. In LTC, a teamwork approach to error prevention is crucial given the complexity of the work environment and of the nature of the residents. An example of the safety strategy adopted by the aviation industry is the use of standardized checklists, which must be used under specific conditions such as during landing, and taking off and especially after an incident has occurred. Similar strategies in LTC are the use of the risk assessment tool and incident reports. The risk of assessment tool must be used upon admission of new residents in LTC and when a fall or even near miss has occurred or been reported. This assessment enables to identify residents who are at greater risk of falls and is an evidence-based strategy for future fall risk prevention (Tideiksaar, 2011).

6.2.2. Common knowledge

The aviation industry has recognized the importance of training and teamwork to improve safety. Just how pilots are given rigorous and standardized training and are required to maintain licensing requirement and to meet some criteria to ensure safety during flying, frontline staff that work in LTC must be educated about the importance of safety practices.

6.2.3. Ergonomics

Each equipment either it be in the aviation or LTC organizations must be designed on the principles of safety and have a history that tracks and records the maintenance process. It is questionable what kind of tracking and maintenance of the

equipment is done in LTC (e.g. wheelchair breaks, lift batteries, hygiene of hip protectors, etc.). Technologies such as compliant flooring systems, surveillance systems and hip protectors also have the potential to be used in LTC to compensate and reduce the risk of human errors within the care process and to mitigate their consequences. Investment in research about their effectiveness in decreasing health care costs due to falls-related hospitalization is still needed.

6.3. Challenges in Translating Lessons from the Commercial Aviation Industry to LTC

Accidents in the commercial aviation industry are rare, highly mediatized and involve the massive loss of lives including both passengers but also the aircrew and pilots. Therefore, the aviation industry is very much invested in safety and adverse events are exhaustively investigated to identify causal factors and prevent re-occurrences (Thomas, Sherwood & Helmreich, 2003). In contrast, adverse events in the LTC normally happen to individual residents, rarely obtain mediatised publicity and there exists no standardized method of investigation and follow-up for organizational learning. Training methodologies also differ in the sense that the frontline staff in LTC receives training in real-life situations whereas the aviation staff first works in a sophisticated simulator to train, maintain and improve their professional (that is their technical and interpersonal skills) (Thomas, Sherwood & Helmreich, 2003). The work hours also differ: the aircrew work with the team with members who are easily identified to work in a flight with a clear start and finish time whereas the frontline staff in LTC is often scarce in resources. This also makes communication very difficult between health care professionals. There is also a hierarchy of roles in LTC and no tracking system of the amount of hours worked by frontline staff that often works excessive amount of hours causing fatigue and stress.

Safety issues are paramount in both organizations. However, LTC face specific dilemmas that are intrinsic to them as health care organizations and that limit the applicability of the aviation model to LTC. Whereas all stakeholders abide to safety in aviation with fear of sanction otherwise, there exist tensions in LTC between different stakeholders such as between residents/families and staff and between staff and leadership in respect to what is important to them. The commercial aviation industry has

followed a set of standardized safety strategies to improve their safety performance. However, in LTC, the concern of following standardized safety operational strategies entails the risk of becoming regimented and task-oriented instead of providing person-centered care. This could also hinder the autonomy, quality of life and quality of care for residents. For some family members, safety may be primordial whereas staff and resident may choose to prioritize the autonomy and quality of life over safety.

This struggle in maintaining a balance between the right for autonomy and safety recognizes that whilst the medical model of care has value in preventing harm and ensuring safety, a more holistic approach that is based on the principles of person-centered is also needed. Managers, policy-makers and researchers have implemented best practices in the area of injury prevention through innovations such as least restraint policy and the creation of an open reporting learning system where injury and falls are being openly reported. These practices go some way to fostering a non-blame culture and create a more effective safety culture in LTC. As an example of safety promotion by design, work is being undertaken to develop advanced technological devices that mitigate the consequences of falls in LTC. In addition to human training on injury prevention, safety can be improved through technological innovation. The TIPS initiatives such as compliant flooring and sensors encompass such advanced safety strategies, which in collaboration with policy-makers, health authorities and researchers enable LTC staff to best optimize the safety of frail older residents in LTC.

The commitment of individuals working in the aviation and LTC industries to address safety issues is influenced by costs and the availability of resources. Change to improve safety must be supported by a financial argument to invest in the cost of safety strategies in reducing harm to residents and risk of hospitalizations. Safety issues in LTC are much more subtle and only come to the forefront if they are very critical and disastrous. Issues about safety incidents are much more likely to be unreported and not analyzed in LTC unless dramatic, that is, resulting in the death or severe injury. This makes it difficult to support the need to prioritize safety strategies in the agenda of LTC organizations. There is also a spectrum of safety issues within health care. On the one hand, errors in areas such as medication cannot be tolerated. On the other hand, the issue of injury prevention is open to debate due to the need to respect and balance the right of residents for both safety and autonomy. This contrasts with the commercial

aviation industry where safety is the overarching concern. Staff in aviation is therefore much more likely or in fact guaranteed to prioritize safety also because everyone is invested in ensuring safe flying conditions.

There is a need to recognize that residents living in LTC have already been placed in environments that insulate them from the risks of the everyday world- being "at-risk" is a major reason for institutionalization. Promoting a home-like setting versus an institution-like setting is also a key issue. And although the medical model of care has its value in preventing harm to residents, a more holistic and person-centered model of care is warranted to respect and balance resident's rights for both autonomy and safety. This recognition has led to the implementation of best clinical practices in LTC through least restraint policy and the awareness that residents have the rights to make the informed decision to maintain their autonomy while being at risk of falls and to the detriment of their safety. Staff in LTC is also empowered by policy-makers through an open and non-blame reporting system where they are encouraged to report incidents when falls occur. Efforts in technological advancements are also conducted to empower the staff, residents and their families to enable residents to enjoy their rights for autonomy and a quality of life by engaging in activities while having access to safety equipment that mitigate their risk of injury. Wearable sensors, compliant flooring and hip protectors are examples of strategies promoting the principles of safety by design that assist staff to ensure the safety of residents while enabling residents to move freely.

Without such practices, LTC are challenged and bound to fail in creating a safe environment for frail and vulnerable older residents unless highly restrictive. Another issue is the incentives and the sanctions that might facilitate and encourage safety in LTC. There are very few if any financial incentives for LTC to prioritize safety and yet, the cost of falls or loss of one older adult who passes away due to a fall can be compared to the cost of multiple losses of lives including of the pilots from a fatal air crash.

Falls in LTC have very little visibility compared to the safety breakdown in aviation. Air crashes and accidents in aviation are highly mediatized and involve thorough investigations over time because accidents in aviation impact more people and hence are more likely to prompt positive attitudes from all including the frontline staff

(pilots), and most importantly from the management. The latter are much more restricted in terms of what they can do and cannot do and must undergo yearly certification to keep up with safety standards. In contrast, the staff in LTC faces the challenge of implementing effective safety practice in an industry characterized by low education and training and high staff turnover.

6.4. Recommendations for Practice and Policy Implications

This capstone has explored some of the lessons and safety strategies endorsed by the commercial aviation industry. One of the key recommendations for practice and policy implications in LTC is to create an informed culture. It is primordial to recognize that for effective fall prevention practice, falls must not only be reported but also systematically analyzed. Therefore, all LTC must share the commonality of having an open, transparent and systematic reporting as well as rigorous investigative procedures of adverse events for organizational learning. LTC must also adopt a systems approach rather than a human approach to injury prevention. This is particularly relevant in LTC since falls prevention require multifactorial interventions and must involve multiple stakeholders including the residents, their families, different team members and the leadership. As part of this process, teamwork and effective communication are also crucial to learn from one another and to work together to ensure resident safety.

The commitment from the leadership of LTC must be translated into educational opportunities for staff to learn about the importance of safety. An organization culture shaped by the leadership that prioritizes resident safety in LTC is essential to ensure the implementation and improvement of safety strategies to prevent near misses and harmful incidents, such as falls and falls-related injuries (Åbert, Lundin-Olsson & Rosendahl, 2009). The definition of safety culture describes the impact of an organizational culture on safety whereby positive safety outcomes result from the efforts of an entire organization to promote safe attitudes, behaviours and practices through clinical routines. Åbert et al. (2009) claim that adopting practices and behaviours that promote safety and inhibiting those that hinder safety should become automatic and ingrained in the routines, values, actions and procedures of the health care organizations, “in the same ways as looking in both directions before crossing a street” (p. 1038).

The active participation of staff in reporting the event of a fall and the commitment of leadership to create organizational systems and procedures for analysis and investigations of these events are indispensable to create a fall preventative safety culture (Åbert, Lundin-Olsson & Rosendahl, 2009). Open reporting of adverse events creates opportunities for organizational learning from the analysis of the reports by explaining the root cause of adverse events and by giving directions towards future actions to prevent the risk of future falls (Åbert et al., 2009). This feedback could also bring the potential to improve the commitment and motivation to prevent falls, and thereby improve the clinical and organizational outcomes (Åbert et al.).

To build awareness and set priorities to improve resident safety, Baker & Norton (2004) recommend forming a provincial expert panel that convenes to discuss safety issues on fall prevention, disseminate knowledge on best practices, and to explain the role of the leadership in creating an organizational culture that support safety. Another strategy would be to develop better reporting systems of adverse events by pilot testing current reporting system and seeking to improve the effectiveness of adverse events reporting and analysis. Given the importance of building skills and disseminating knowledge on safety, it is recommended to provide educational opportunities and regular safety requirements at all educational levels, that is, at academic and professional levels to sensitize all staff in LTC about the importance of safety. To support organizational and policy level changes to improve resident safety, patient safety programs and initiatives should be integrated into the accreditations standards of LTC organizations. Legislation changes should also encourage open reporting of errors and near misses to investigate effective and proactive safety strategies for the prevention and management of risk. Lastly, legislative staffing level changes must be brought forward to the government through the development and the implementation of a more mature safety culture in LTC by establishing of working group whose research agenda is to develop policy and practice, offering consultation and education with LTC providers and explore some selected emerging issues to support the need of increasing health care expenditures for LTC and explaining how the provision of increased human resources could prevent falls and falls-related injuries in LTC.

7. Limitations and Future Directions in the Research on the Safety Culture in LTC

This capstone paper has attempted to review two broad areas in human safety research that are very different in scope. It is therefore a partial review rather than a systematic review of these two areas. It also suggests a personal interpretation of the literature deriving mainly from peer-reviewed academic journal articles rather than books. A majority of the articles were also hand selected and therefore a different search strategy may provide a different critical synthesis. Future studies are warranted to the evidence of the effectiveness of applying lessons from the aviation industry in HC particularly in LTC. Future studies on LTC safety culture research require evaluating the attitudes of different stakeholders not only frontline clinical staff but also of families, visitors and particularly residents (Bonner, Castle, Perera & Handler, 2008). It would also be interesting to investigate the relationship between safety culture and clinical outcomes. Hypothetically, a shift towards an effective proactive attitude and approach to creating a safety culture should be translated into fewer human errors and when these occur, these should be seen as opportunities for organizational learning and systematically investigated by a safety board in all LTC. In such situation, reporting falls would be seen as an opportunity to provide adequate training to staff about injury prevention and on evidence-based practice on fall prevention to ensure the safety of all living and working in LTC.

8. Conclusion

This capstone on safety culture has provided the background understanding of the importance of resident safety in LTC organizations in reducing adverse events, such as falls and falls-related injuries. By fostering an effective safety culture based on open communication and learning with the support of management and the implementation of advanced technological equipment that promote safety by design, this capstone gave an initial set of actions and recommendations to improve the philosophical approach to the management of risks (from a reactive to a proactive one), using a systems approach to disseminate knowledge on effective practices. The principles and dimensions of safety culture include open communication that encourages reporting errors, provision of adequate staffing resources, supervision and a positive learning environment as well as problem-solving approach as opposed to a problem-raising approach. It is believed that providing LTC leaders with the skills and tools to impact safety areas may lead to improved resident safety outcomes and lower staff turnover and that understanding resident safety culture is critical, for both policy and for best practices to address safety in LTC organizations.

This capstone project has illustrated that although a medical model of care has its value in preventing harm in LTC, a more holistic approach based on the person-centered model of care could serve the purpose of empowering residents to cherish their autonomy in their remaining years. In addition to providing training on teamwork and communication processes, staff could also be empowered to create an effective safety culture through the implementation of technological advancements that promote safety by design. Similar to the commercial aviation industry, when frontline staff are empowered with proper training, proper equipment and proper processes, safety and can be optimized and risk of injury mitigated.

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